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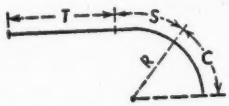
The American Society for Engineering Education

Engineering Mechanics

by L. E. Grinter



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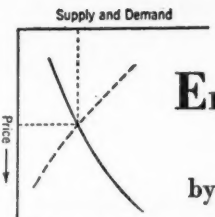

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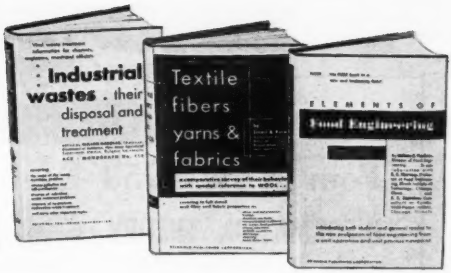

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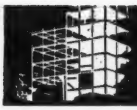

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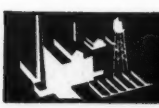

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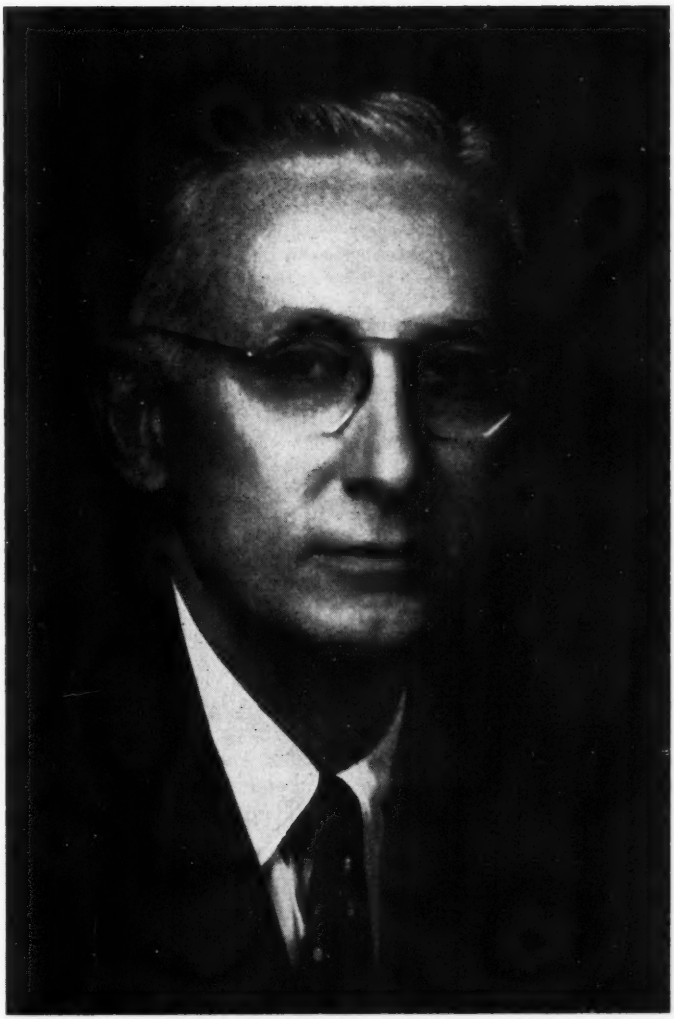

L. E. GRINTER, PRESIDENT

L. E. Grinter, President, A.S.E.E., 1953-54

President Grinter is well known to all ASEE members for his constructive and energetic activities which have led to significant milestones in the Society's progress. Among his contributions must be included the very effective work as Chairman of the Committee on the Improvement of Engineering Teaching, which brought into active participation over 1,000 members of ASEE throughout

the country and which culminated in a report of which over 10,000 copies have been sold. He was also Chairman of the Committee which prepared the "Manual of Graduate Study" and also of a subsequent committee which rewrote the Manual. During the past year, he has served as Chairman of the important Society Committee on Evaluation of Engineering Education.

As Vice President of the ASEE in 1950–52, he was an effective and inspiring leader in Society activities. Dr. Grinter has long been active in Society affairs, having helped to organize the Texas Section of ASEE, as well as the Civil Engineering Division. He was also responsible for arranging the *Civil Engineering Bulletin* as a quarterly publication with permanent financial sponsorship. Dr. Grinter was Chairman of the Committee on Civil Engineering Library that published the first check list of one thousand important books and served as a member of the General Council of the ASEE from 1936–1938 and 1948–50.

Dr. Grinter has served as a consultant to the War Manpower Commission, the Civil Defense Administration, the National Science Foundation, the Weapons Test Center, Elgin Air Force Base, the Board of Southern Regional Education and supervised revision of the section on enginering and metallurgy in the Encyclopaedia Britannica.

Our new President hails from Kansas City, Missouri. He received his B.S. from the University of Kansas, and his M.S. and Ph.D. from the University of Illinois. After two years as an engineer for the Standard Oil Company, he entered the educational field as a Professor of Civil Engineering at Texas A. & M. College. Beginning in 1937 he served as Dean of the Graduate School and Head of the Department of Civil Engineering, and later as Vice President of Armour Institute of Technology. From 1940–46 he served as Vice-President and Graduate Dean at Illinois Institute of Technology. He is now Dean of the Graduate School and Director of Research at the University of Florida.

Dr. Grinter has written many technical and educational articles in various publications and has written several books, largely in the field of structural engineering, the latest of which, "Engineering Mechanics," was published in August, 1953.

Sections and Branches

The **Pacific Northwest Section** Annual Meeting was held on the campus of the State College of Washington, April 24 and 25. The theme "Adequacy and Standards of Engineering Education" was discussed from the the standpoint of the effects of entrance requirements, accreditation, state licensing, operational funds, humanistic-social studies, and requirements of industry. The annual banquet was featured by President W. R. Woolrich speaking on "Our Responsibility to Up-Grade the Engineering Profession." In addition, the general program included the reading of the Section's winning paper in the YET contest and a report on the recent meeting of the National Committee on Evaluation of Engineering Education. April 25 was also the date for the Section's annual ECRC session.

Attendance was high and included members from Oregon State College, University of Washington, University of Idaho, Montana State College, Montana School of Mines, Gonzaga University, Idaho Junior College, General Electric Co., Boeing Airplane Co., and the State College of Washington.

The following officers were unanimously elected: Chairman, L. E. Slegel; Vice Chairman, J. W. Smith; Secretary, T. J. McClellan. E. R. Wilcox was elected Section Representative to the General Council to fill the vacancy occasioned by the passing of C. A. Mockmore.

1953-54 A Year of Evaluation

By L. E. GRINTER

President of ASEE, Dean of the Graduate School and Director of Research, University of Florida

At least once in each decade the program of undergraduate engineering education should be reviewed, evaluated, and the wheels of revision set into motion. The last concerted effort in this direction was taken nearly a decade ago when the report on Engineering Education after the War was published by the Hammond Committee. Ten years slip by so quickly that we find it difficult to realize how many things that are commonplace in engineering today were almost unkonwn in 1944. Rocket flight, jet engines, nuclear power, fluorocarbons, new commercial metals, new plastics, silicones, new fabrics, television, transistors, prestressed concrete structures, and guided missiles are developments of the past ten years. Engineering education, even if it had been thoroughly revised and brought up to date in 1944, would have suffered unavoidable dislocations from these revolutionary engineering developments.

The effect of advancements sometimes appears clearer when we look forward rather than backward. If we should do our best to bring undergraduate engineering education into adjustment with the known demands of scientific and technological advances in 1954, it is quite clear that the adjustment would be out of focus a decade later. In fact, the progress in science and engineering is so rapid that we should no longer expect to stabilize our curricula for even a decade ahead. This, however, does not relieve us of the responsibility for doing everything possible to train the leaders of the engineering profession for ten, twenty or more years in the future. Such leaders in 1964 or 1974 must be at no loss to interpret, use and themselves contribute to the development of the fields of enginering science as effectively as the engineering leaders of the nineteen twenties and nineteen thirties contributed to the development of engineering art.

The fact that we see ahead no probable plateau upon which science and engineering development can rest in its upward climb leads to the conviction that more opportunity for change and more experimentation are vital in engineering education. Too often an evaluation of a given undergraduate curriculum has proceeded on the basis of a comparison with the average course requirements in a number of other institutions. In fact, the program of accreditation has been criticized, and perhaps justifiably, for encouraging such standardization at the level of mediocrity. The weakness of all accreditation based upon minimum standards is that such minima are likely to be accepted by many individuals and institutions as representing a desired norm.

Instead of an attempt to approach the average of other educational programs by the process of evaluation we should encourage each institution to determine where and how it can produce a result of distinction. If the dean of engineering responds alike to the requests of all departments and divides the resources of the college as equitably as possible between all activities on a numerical basis, the final result is almost certain to be the achievement of mediocrity. Distinction cannot be achieved everywhere; hence the achievement of distinction in any one ac-

tivity must ordinarily mean that resources are not being divided on a numerically equitable basis. There is another viewpoint, however, of equity. If quality of achievement can be attained in a given activity, and if quality as distinct from quantity is to be recognized as having a special value to the university, additional support for this meritorious activity is fully justified. By acceptance of this philosophy an institution will develop peaks of excellence from which its influence will grow beyond its immediate locality.

If each of our colleges of engineering could set aside a small portion of its overall budget for the support of one or two distinctive programs of undergraduate and possibly graduate education, a spirit of experimentation would soon be established in place of the rather standardized or routine approach that characterizes too much of present engineering education. When the rush of veterans was at its height there was an adequate excuse for avoiding undergraduate experimentation; a smooth routine operation is always the essence of good mass production. However, the development of peaks of excellence in education will never be achieved without experimentation. Hence, an overemphasis upon organization can conflict with the objective of distinction.

A new rush of undergraduate students is due to overload our facilities and staffs in engineering education near the end of the present decade. Then again a premium may have to be placed upon mass production and the opportunities for experimentation will be reduced. Following the present *Year of Evaluation* freedom will exist for a few years of educational experimentation. It, therefore, seems probable that the next five years will be a critical period in the long-term history of engineering education.

Let us make every effort in the years immediately ahead to find workable solutions to two great problems that face us:

(1) How can we produce the necessary engineering scientists and specialists, who need intensive undergraduate work in mathematics, chemistry, physics and the many fields of engineering science, without interfering with the flow of general professional engineers that have served past generations so effectively and are still fully adequate for useful service in stabilized fields of highly applied technology, for service in production, operation, construction or maintenance, or for association with another field such as business, management, sales, law, real estate or agriculture?

(2) How can we stimulate the creative capacity expected particularly of those who practice in research, development or the more specialized or scientific phases of design and of those who will become the engineering leaders of one, two or more decades in the future? Engineering education needs to extend greater opportunities for self-development to those students with unusual talents without placing unrealistic demands upon other students having a more limited horizon. We need to break the lockstep of fixed curricula for students who vary far more widely than the proverbial square peg and the round hole.

The range between effective capacity for performing routine engineering duties and capacity for invention or for engineering leadership seems too great to be meet by a single fixed educational program. Until each institution has solved the problem of permitting talented students wide opportunity for developing initiative and for use of creative thinking we will need extensive experimentation in undergraduate engineering education.

Do You Know—

► The Fall Meetings of the ASEE this year will be held in conjunction with the Annual Meeting of the Engineers' Council for Professional Development at the Statler Hotel in New York, October 15–17. The conference program, open to all members of the ASEE, sponsored by the ECRC–ECAC, will feature the theme "Creativeness in the Arts" and "Creativeness in Engineering." Speakers will include a musical composer, an artist, and a poet who will discuss the process of creative thinking in the arts. Two prominent research directors will present a discussion of creative thinking in engineering. A psychologist will dissect the subject of creative thinking at a luncheon meeting. This promises to be an exceptional meeting which you will not want to miss. If you wish to attend, write to the Secretary for reservation forms.

► The General Council of the ASEE will meet on the afternoon and evening of October 14. A special meeting is also called for Division Chairmen and the members of the General Council representing Divisions to meet with the Executive Board at 10:30 A.M. on October 14. Arrangements will be made for meeting rooms for Divisions and Committees which wish to hold Executive Committee meetings at the time of the Fall meetings. The ECPD program on October 16–17 will feature open conference discussions on accreditation of engineering colleges, engineering manpower, and a luncheon discussion of the St. Lawrence Seaway Development. All members of ASEE are invited to attend the ECPD conferences as well.

► Those who attended the Annual Meeting at Gainesville will carry with them fond memories of a profitable meeting and a pleasant time. The programs of the Divisions, Councils, and Committees were directed at vital current issues in engineering education and proved to be highly stimulating. The Local Committee at the University of Florida did a superb job in planning facilities and entertainment for the guests. Dormitory accommodations and meals were exceptionally good and the mild heat was compensated by the advantage of being able to move from one air-conditioned building to another—a unique feature for ASEE meetings.

► Did you notice the attendance and interest exhibited at the new General Session at Gainesville on Monday afternoon at which Society projects were discussed? Vice President White and the Committee Chairmen who presented their reports in a stimulating and informative way deserve high honors for an efficiently conducted and highly interesting meeting. There has been considerable comment to the effect that this should be repeated. What do you think?

► The ECRC General Session on Wednesday morning with papers by Messrs J. W. Barker, C. F. Prutton, and H. L. Hazen, presented an unusually penetrating analysis of research as an aid to education. Also, the ECAC General Session on Thursday morning, with papers by Dean Roy M. Green and Professor C. S. Crouse on "Engineering Education and Engineer in Training Examinations," opened up a provocative discussion which endured for the balance of the Annual Meeting. Many thanks to Deans Walker and Lampe for the excellent job of programing these General Sessions.

► Mr. Karl McEachron, Sr. of the General Electric Company did an excellent job of summarizing the growth of unionism and the unity concept in the engineering profession at the Wednesday morning General Session, and President Woolrich's talk "Education and the Engineering Profession" was a distinctive highlight of the convention.

► As a member of the ASEE, you will want to read the report of the Committee on Society Finances. This report summarizes recommendations for a new dues structure. During the past year, the deficit in ASEE operations amounted to $1,688. It appears that a deficit of the order of $3,700 will be incurred next year. The Society is operating with rock-bottom overhead and every effort has been made to increase income. Our headquarters office currently employs only three secretaries. We have one staff member for every 1,500 Society members. Other major engineering societies have approximately one staff member for every 300 to 400 members. Society activities are expanding and this has placed a greater burden on the secretarial staff. Because of serious staff overloading, it is inevitable that additional secretarial help will be needed to assure satisfactory service.

There seems to be no escape from the fact that the $6.25 average dues per member is today worth little more than half of its value in 1947. The Society has endeavored to stave off financial difficulties by expanding its individual and institutional membership, as well as by increasing advertising in the Journal. The individual membership has approximately doubled during the past six years. But expansion of membership with the present dues structure cannot be regarded as an additional source of finances, since the cost of each additional member approximately equals the dues.

The numerous important projects which the Society has undertaken, as well as the expanded activities of its Councils, Divisions, and Sections have resulted in substantial increase in service to engineering education. Also, the ASEE is taking its rightful place in the coordinated activities of ECPD, EJC, and the American Council on Education and other professional societies.

► The two resolutions voted by the ASEE Committee on Evaluation of Engineering Education and considered by the General Council of the ASEE, relating to the establishment of bifurcated engineering curricula and the raising of minimum levels of accreditation of engineering curricula, will be published in the October issue of the JOURNAL. They will no doubt be controversial issues and you will probably want to study them carefully.

► In the event that you did not attend the Annual Meeting at the University of Florida and have not heard of the election results, the newly elected Officers of the Society are Dean L. E. Grinter, President; Dean B. R. Teare, Vice President in charge of Sections and Branches; Dean W. L. Everitt, Vice President in charge of ECAC; and Mr. George Farnham, Treasurer. Dean Eric Walker and Vice President W. C. White carry over for another year as Vice Presidents of ASEE. The Council members are listed on page two of this issue of the JOURNAL.

► Next June, the Annual Meeting will be held at the University of Illinois, June 14–18, 1954. You will want to reserve these dates and plan to attend. A number of outstanding features are already shaping up for this Annual Meeting program. We'll tell you more about these in a later issue.

► The Committee on Evaluation of Engineering Education has suggested that the Divisions of the ASEE consider directing their Annual Meeting programs next June toward evaluation of engineering education in their particular curricular areas. This Committee hopes to have a preliminary draft of its report completed and reviewed by the institutional committees in engineering colleges throughout the country by next February or March.

▶ If you are interested in preparing a paper for submission at the Annual Meeting, may I suggest that you get in touch with the Chairman of the particular Division. Usually the Divisions shape up their programs in November and December preceding the Annual Meeting.

▶ Watch the October issue for a complete roundup of Council officers and Division, Committee and Section Chairmen.

▶ Are you interested in receiving copies of the newly completed "Manual of Graduate Study" or the "Report of the Committee on the Improvement of Teaching"? Copies of these can be obtained from the Secretary's Office, the price of the Graduate Manual being 50¢ and that of the Report of the Committee on the Improvment of Teaching being 15¢ each or $8.00 per hundred. All orders should be accompanied by a check remittance.

▶ You can now get your copy of the "Review of Current Research and Directory of Member Institutions," published by the ECRC, which is just off the press. This is a complete directory of research projects in engineering colleges throughout the country. For a copy write to Professor Virgil Neilly at Pennsylvania State College., State College, Pa. The price is $2.50.

▶ Did you notice that the two winners of the Young Engineering Teachers' Paper Contest were both from small western colleges? They are Lee Harrisberger of the University of Utah and Ralph Smith of San Jose State College. The General Council voted to repeat the YET Paper Contest again this year. There were over 75 entries indicating widespread interest in this activity. Next June, the two top awards will again be presented at the Annual Banquet. Here is an opportunity for the young faculty members to gain distinction. The rules will be published in the October issue of the JOURNAL.

▶ The other award winners included President Harry S. Rogers, recipient of the Lamme Award; Professor Edward Obert, Recipient of the George Westinghouse Award; C. W. Beese, Technical Institute Division Award; Carl L. Svenson, Engineering Drawing Division Award.

▶ This year the Young Engineering Teachers' Committee will take over the Membership Drive. We hope that you will give them wholehearted cooperation. The Officers and General Council are particularly anxious to integrate the young faculty members into Society activities, since this will enable them to broaden and enrich their professional outlook. It will also bring to ASEE that element of vigorous, unorthodox thinking which is characteristic of youth and which is so vital to progress.

▶ Our last year's President, Dean Woolrich, and his wife left three weeks after the ASEE Annual Meeting for a relaxing trip to England, the Scandinavian countries, and Continental Europe. Our best regards go with them. Last year, Dean Woolrich attended every ASEE Section Meeting west of the Mississippi River except one (which was attended by Vice President Boring). President Woolrich was also responsible for initiating a number of important Society projects which will come to fulfillment in the years ahead. These include studies in Ethics of the Profession, Recognition and Incentives for Good Teaching, and an abrupt awakening of the engineering profession to the growing dangers of unionization.

▶ Each year, when Officers of ASEE retire from top-echelons, we look forward hopefully to their continued participation. This year, Dean Lampe and Mr. M. M. Boring retire as Vice Presidents. They have both devoted a great deal of time and constructive effort to the organization and supervision of ASEE activities. Also, our retiring Treasurer, Mr. Skelley, has rendered exceedingly helpful advice and assistance throughout three years of competent service. To all of them go our many thanks for their cordial and efficient service.

► The Committee on Associate Institutional Membership, under the able Chairmanship of Jesse McKeon, has come through with 60 new Associate Institutional Memberships, consisting of large companies which have substantial engineering operations. Congratulations on the excellent job. It is the policy of ASEE to develop closer working relationships with industry. A long-range program of mutual enlightenment and assistance can be of great benefit both to the engineering colleges and to industry.

► Watch for this column in October. At that time we will give you more news of projected ASEE activities for the year ahead.

Best Regards,

ARTHUR BRONWELL, *Secretary*

Report on UPADI Convention

The Second Convention of the Pan-American Federation of Engineering Societies (UPADI) was held in New Orleans, La., August 25 through 29, 1952. The Engineers Joint Council and the Engineering Institute of Canada were co-hosts. Dean L. J. Lassalle of Louisiana State University and Dean S. S. Steinberg of the University of Maryland were the official delegates of A.S.E.E. Since Dean Steinberg is an honorary member of the Society of Engineers and Architects of the Dominican Republic, he was asked to serve also as an official delegate of that Society.

The total registration was 314 and the delegates represented 14 countries, including Canada and 11 Latin American republics. The sessions were held in the McAlister Auditorium of Tulane University. Carlton C. Proctor, president of the American Society of Civil Engineers, was elected president of the Convention, and Luis Giannattasio of Uruguay was elected honorary president. James M. Todd, past president of the American Society of Mechanical Engineers, was chairman of the local organizing committee and also headed the United States delegation. Dean Lassalle was Chairman of the Technical Program.

Dean W. R. Woolrich, president of A.S.E.E., presided at the technical session dealing with engineering education. At this session, papers were presented by deans of engineering schools from Canada, the United States and Latin America. Dean K. F. Tupper of the University of Toronto spoke on Engineering Education in Canada; Dean Steinberg and Dean Woolrich spoke on Engineering Education in the United States; and several delegates from Latin America discussed the status of engineering education in their respective countries, including Brazil, Cuba and Peru.

At the business sessions, a Constitution and By-Laws for UPADI was adopted, and a UPADI Fund was created for financing the organization.

In addition to many social events, a number of inspection trips were arranged for the delegates, including the Kaiser Aluminium Works, the Port of New Orleans, the U. S. Experimental Waterways Station at Vicksburg, Miss., and the Freeport Sulphur Company.

It was decided to hold the next Convention in 1954 in Sao Paulo, Brazil, when that city will observe its four hundredth anniversary.

S. S. STEINBERG,
Dean, College of Engineering,
University of Maryland

Education for Professional Engineering Responsibilities *

(From Origin to Present Challenge)

By W. R. WOOLRICH

Dean of Engineering, University of Texas

The Sixty-First Annual Meeting of the American Society for Engineering Education is convened here at the University of Florida to carry forward the business and educational objectives of the Society and also to renew old friendships and establish new fraternal contacts on this attractive campus dotted with its many buildings of southern architecture. Actually we are punctuating the end of the sixtieth year of what originated as the Society for the Promotion of Engineering Education during the World's Fair in Chicago July 30–Aug. 5, 1893. For the information of the younger members, the original society merged with the Engineering College Research Association in 1947 to form the present American Society for Engineering Education.

If today we would review the rise and development of the profession of engineering for civil life we could perceive the first evidence of a group concern and comradeship when John Smeaton of England called together sixty-five men with engineering interest for a meeting at King's Head Tavern, Holborn, London, in March 1771. Of this total number only fifteen were said to qualify as men of professional engineering stature. In addition to Smeaton, these fifteen included Joseph Whitworth, Joseph Priestley, Mathew Bolton and James Watt.

To those who are interested in industrial history the year of 1771 can be associated with the developing industrial revolution of Western Europe.

The record shows that this first engineering society was dominated by John Smeaton; and when, in 1792, some of the younger members of his group challenged his leadership, Smeaton's personal hurt was so intense that he disbanded what had become known as the "Smeatonions."

The experience of Smeaton may be regarded as the first attempt of an individual engineer to regiment the members of his profession. It was an example of what could be anticipated by any subsequent leaders who failed to recognize that, in dealing with the active members of a creative profession, each individual member cherishes greatly the freedom of thought and action that true professional distinction implies.

On April 15, 1793, a new organization was assembled in London with many of the same members who had made up the disbanded Smeatonion group. It took the name of The Society of Civil Engineers. John Smeaton had participated freely in the reorganization plan but, ironically, died just before the organization of the new group was effected.

The record shows: "It was conceived it would be a better plan that the members should dine together at a late hour, after attendance at Parliment and pass the evening in that species of conversation

* Presidential Address, ASEE Annual Meeting, University of Florida, 1953.

which provokes the communication of knowledge more readily than it can be obtained by private study or from books alone." It is of interest that for many years after the founding of this new organization, at each fortnightly dinner meeting at the Crown and Anchor on the Strand, "a pious tribute was always paid to the deceased John Smeaton."

Society of Civil Engineers

This Society of Civil Engineers was constitutionally limited to "Forty-eight engineer members and twelve honorary members." Although its effectiveness was dwarfed by its limited membership it is still existant in Great Britain today but functions only to honor British Engineers of distinction who are selected under the limitations of the original constitution.

The principal weakness of the Society of Civil Engineers was this limited membership. The industrial expansion of Great Britain co-incidental with the industrial revolution created a demand for an organization with a broader base. Under the leadership of Thomas Tredgold the Institution of Civil Engineers, with more professional objectives, came into existence January 2, 1818. One of its early problems was to find some satisfactory specifications by which the members should be selected. This gave occasion for the writing of a suitable definition of engineering by Tredgold, which definition has withstood one-hundred-thirty-five years of progress without too much to add or subtract from it even in 1953.

The Institution records show that of their first ten presidents only two had the advantage of a University education and these two were from Scottish institutions. Engineering education for most of those who achieved distinction was acquired by the "pupilage" procedure so common in Europe until the Twentieth Century.

For fifteen years after the formal organization of the Institution of Civil Engineers there were discussions in both Great Britain and North America about the possibilities of a system of formal engineering education. France had had some success in instituting specialized science and engineering schools. Military colleges patterned after the French system had been set up on both sides of the Atlantic Ocean. In the United States, Norwich University and Rensselaer Polytechnic Institute next took the initiative and offered work in Civil Engineering. University College, the University of London, followed by appointing a Professor of Civil Engineering in 1828; but due to the opposition from the Professor of Physics of that institution, no formalized curriculum was made available until 1841. In the meantime King's College, London, appointed a Professor of Civil Engineering and in 1838 had a recognized curriculum for Civil engineers—thus establishing its claim to being the first University in Great Britain to offer and follow through an engineering curriculum.

This first epoch in the education of professional engineers, a period when volunteer societies worked together with those who had engineering apprentices, followed a plan of education by the "pupilage" system. This system was slowly to give way to the formal procedures of education in the classroom. A long fight was still ahead, however, since most of the Universities of the world would resist the invasion of both the sciences and the engineering courses in the published catalogues. Of these two, engineering was the least palatable to the educator with the Liberal Arts background.

World Congress in Engineering

The next epoch in the development of engineering might be considered as extending from the beginning of the period of the earliest University education in engineering in Great Britain and North America to the World Congress on Engineering at the World's Fair in 1893. On both sides of the Atlantic the debate went on from year to year between the champions of liberal arts education and those who supported the sciences and engineering. In the United States, Union College

had sufficient courage to introduce (1845) an engineering curriculum. The real break in the opposition to engineering education in the Universities within the United States appears to have come, however, in 1851 and 1852, when four of the leading American Universities admitted to their catalogues curricula leading to an engineering degree. The record shows that engineering was instituted at Dartmouth in 1851, and at the Universities of Michigan, Harvard, and Yale in 1852.

Ten years later the Federal Land Grant Act was signed by President Lincoln and the United States was ready for an unprecedented expansion of public higher education, especially in agriculture and engineering. Within another ten years (1872) seventy colleges were offering engineering degrees in the United States.

The rapid expansion of engineering education in the United States in the post-Civil War period was accompanied by many examples of poor judgment in setting up engineering curricula. The universities and colleges offering engineering education had widely differing objectives and backgrounds. Their differences in purpose were as varied as the origins of their operating funds. Further, the individual conceptions as to the objectives of engineering education by the newly appointed deans of engineering colleges were very far apart.

In the Canadian provinces, the policies for the education of engineers were more conservative during this period. They embodied much of the European pattern of emphasizing the fundamental sciences but did not overlook the fact that, as frontier regions, they must fortify their students with the ability to do much with little.

In Great Britain a dual system was in the making. Those who were privileged to study at some of the *Universities* could follow an engineering curriculum leading to a formal degree. However, others who might follow a similar curriculum in a *technical college* would be awarded, upon their completion of the outlined program, a diploma only.

Formation of SPEE

The formation of the Society for the Promotion of Engineering Education at the completion of the World Engineering Congress in 1893 was most fortuitous as the beginning event in a new, or third, epoch in engineering education. It constitutes a milestone that we can celebrate with real pride today. The Society has for the past sixty years been an inspirational and coordinating force. Its members have given unselfishly of their time and talent to upgrade their profession. Today our co-workers in the other learned professions and engineering educators of the other nations envy our Society for its record of service to the human race and to our national progress.

Within these past sixty years, engineering as a profession has come of age. The services rendered to the people of North America by the engineering educators of both the United States and Canada throughout World Wars I and II, plus the far-reaching contributions made by the thousands of professional engineers whom these same educators have nurtured through their years in college, bespeak a citation far beyond human expression.

As we look forward into what could well be a distinctive fourth epoch in engineering education for professional engineers, there are many signs of a promising future of our chosen profession. The most assuring of all of these indications is the high type of leadership to be found in our engineering colleges of both the United States and Canada. I am confident that I speak with the approval and support of all the members of your elected and appointed officers when I express complete confidence in the administrators and teachers of our engineering colleges in America.

They and we are not so naive, however, as to fail to recognize that there are some forces influencing our engineering profession about which we need to be most watchful.

Present Threat

Throughout the past 183 years of professional engineering endeavor, during which there has been general concerted effort of engineers to achieve professional distinction, we also find some minor attempts to impede professional growth. No force from within, however, has formerly posed as great a threat as does the present activity of the Engineers and Scientists of America. They are now attempting to gain the ear of the U. S. Congress and the Secretary of Labor to the effect that their organization may be named "to speak for the approximately 400,000 employed non-supervisory professional engineers and scientists who are so vital to our national defense and to our way of life."

Printed statements by President Joseph Amann of the Engineers and Scientists of America Union in the supporting labor journals give definite evidence that the Union seeks to place the average engineer in a class with tradesmen and definitely on the workman's side of the collective bargaining conference table.

I would like to re-emphasize the editorial statements given through the *Journal of Engineering Education* in the April 1953 issue: "The engineer of less than average ability can generally be given a salary lift by a collective bargaining agreement. In the levelling off process he gains at the expense of those who are above the average. When a union is first established there may be even a higher average wage than could have been obtained by individual contract by superior engineers. But the future is not too bright in collective bargaining for the advancement of men of creative genius and individual professional abilities. Collective bargaining is never inspirational to the man of creative talents, and recognition within a union cannot be readily afforded him other than as a part of a collective group."

On the other side of this question there is a large segment of American industry that has failed to be realistic in its adjustment of salaries and wages of its employed professional engineers. The salaries for beginning engineers have risen at a much faster ratio than have the increments of advancement for qualified engineers of five, ten, and twenty years of service in some companies within this unrealistic industry segment to which I refer. Actually, in some instances, the starting salary curves for recent graduates have intersected the average salary curve of men of some years of service and experience within the engineering profession. It is the American industrialists of this negligent segment who furnish bonafide reasons for some union or other group to challenge the administrative competence of the managers concerned.

Many individual members of the Relations with Industry Committee of the American Society for Engineering Education (ASEE) are performing an urgently needed service in encouraging the revision of the salary scales for engineers of several years service and in securing the advancement and recognition of these men commensurate with their professional contributions.

The employer of the professional engineer, whether he is with a University, a Federal or other government agency, or an industrial concern, should provide the incentive and recognition for advancement within the profession wherever possible. If industry and government are going to avert the growth of unionism within professional engineering circles, then the compensation offered for engineering service must be commensurate with the abilities and contributions of each individual within the profession. *It is essential that the salaries of men of accomplishment and years of service shall be an incentive to the men entering the profession.* This calls for a wider spread in compensation between the salaries of the beginner and the engineer of several years of competent service. This spread should be commensurate with their respective values to the employer.

We within the engineering profession,

together with the employers of engineers, must face this problem with understanding and positive constructive action. Those within the union circles who would speak for us at the conference table are alert to the weaknesses of the salary scales of some industrial groups and are ready to move in.

Effective Answer

The most effective answer to unionism is a full recognition by the employer of each individual as a professional engineer. The professional engineer is usually a man who prefers freedom of thought and action to that of herd classification, but he should—and does—expect adequate consideration for his specialized services.

Another economic force that can threaten the higher achievement possibilities of engineers and scientists in the United States is the current zeal of the Armed Services to put every able-bodied engineer and scientist in the Reserve Officers Training Corps of each campus. If this is judiciously carried out it can be mutually beneficial to the military and the universities, but there are evidences that our industrial development of the United States may be sharply curtailed by military short-sightedness.

While assurances have been forthcoming to this Society that interference with the engineering curricula by contracting officers representing their respective services will not be tolerated, and further adequate provision was promised that men would be assigned duty in their fields of specialization after conference with the Deans concerned, we should make a continuing pool of our engineering graduates to determine the effectiveness of those agreements.

The per cent of engineering graduates that will be required to serve as officers in some branch of the military is rapidly increasing. The number exempt from such service is very low. The Manpower Committee of the Society is rendering most valuable service in appraising trends and advising both military and civilian agencies in Washington as to the future needs and reservoirs of engineering man power in the United States and in suggesting a judicious handling of the problems involved. In this field of the effective use of the available man power, it is of further importance that we do not overlook the man power problem in our own teaching ranks.

It would be well for all of us associated with the American Society for Engineering Education to give serious thought to the compensation of engineering teachers in relation to the salaries currently being paid by American industry.

Shortage in Instructional Manpower

Recently, in a newsletter sent to many of you, we called attention to the serious impending shortage in instructional manpower. The combination of in-elastic college financial budgets, especially in state-supported schools, together with the rising pay scales of industry is causing the desertion of the engineering teaching profession to industry by well trained engineers at an accelerated rate.

More recently President Edwin S. Burdell of Cooper Union has emphasized the same problem in an article in the June number of the *American Engineer*. He called attention to the fact that many evening students currently enrolled in engineering colleges are earning salaries higher than the salaries received by their profesors. Quoting President Burdell: "The inequity of such a situation is obvious. When a man sees those whom he is teaching making far more than he does even before their student days are over, he naturally begins to wonder if he should not step over to the other side himself.

"To state it bluntly education faces a new competitive challenge in industry's growing understanding and application of human relations, the doctrine that wages and fear of unemployment are man's only incentive, is rapidly being superseded as we move into the second half of this century. Security and human dignity, once the chief justification of the low pay scale

of the teaching profession, are now to be found in industrial personnel policies and practice."

Industry itself, in order to assure a supply of adequately educated engineering graduates, may find it necessary to loan personnel for engineering teaching or, through the appropriate foundations, to supplement the teaching salaries of the engineering teachers especially in the upper ranks in order to keep these men in the teaching profession.

The American Society for Engineering Education Council has authorized the appointing of a special Committee on Instructional Manpower to study this problem and, if the committee finds it advisable, to meet with industrial leaders to try and find the answer to this urgent and critical problem.

Your President is appointing such a Committee and I hope it will go into action immediately. If some definite action is not taken, we can expect there will be a serious deficiency of several hundred engineering teachers when the fall semester or term opens in September 1953.

A Higher Goal

May we turn now from the commenorative, the historical, and the analytical to a look forward to an even higher goal of achievement in the future for the aims and objectives of the teaching of engineering as a profession.

In 1952, Past President Hollister with Council authorization appointed a special committee on the evaluation of Engineering Education. Through the sponsorship of the Society for the Promotion of Engineering Education, previous periodic analyses and appraisals had been made of the aims of the Society under such committee titles as the Aims and Scopes of Engineering Curricula in 1940, and the Engineering Education after the War in 1944.

The happenings of scientific moment that have occurred between 1944 and 1952 justified a more searching study of the aims and objectives of engineering education. Especially was it hoped that an honest attempt would be made to put date marks of the future needs in engineering education for five, ten, fifteen, and twenty-five years beyond what you and I are teaching in the classroom today. How great is this inertia lag in engineering classroom teaching today and what are the probable remedies?

Momentous questions naturally arise in any such study. The members of the many institutional committees who have been studying these problems realize this. Yesterday we had the benefit of some of the thinking of the main committee when it was presented by the Committee Chairman Dean L. E. Grinter at the Annual Business Session.

There is always danger in such a study that iconoclastic action may prevail as a way out from some difficult problem. As emphasized in the papers presented during the Centennial of Engineering in Chicago, there is much to be preserved in an engineering education system that has made many great professional engineers in the United States and Canada and that is now the envy of the world for its total effect upon industrial productivity of these two nations.

The engineering profession has come a long way since the Smeatonions with their fifteen engineers and fifty hopefuls organized the first group that considered themselves professional as they sat around the tables of King's Head Tavern, one-hundred eighty-two years ago. We witness the first third of that period passing away before the English-speaking world recognized that any formalized technical education was desirable for professional engineering. The next sixty years were spent by the maturing profession in breaking through the crust of scholastic imperialism of the Liberal Arts College leaders and in earning recognition as desirable associates for men of letters in Universities and Colleges. In the passing of the last third of these one-hundred eighty-two years the proceedings and papers of the American Society for Engineering

Education and its predecessor, the Society for the Promotion of Engineering Education, tell a realistic story of the earnest efforts of a great galaxy of American engineering educators and professional engineers who have given this Continent the best in engineering education.

Committee on Evaluation of Engineering Education

Through the Committee on Evaluation of Engineering Education there comes before us the question as to what course work should go into discard, what retained, and what new source material should be recommended for our several curricula. Of one fact many of our members are certain—the life stream of the profession should flow deeper, not wider. We need to stop following the pattern of the amoeba by incessant splitting off and subdividing into new engineering degrees, ad infinitum.

Some have raised the question of whether production, processing and operation can lead to a professional engineering status with the same level of distinction as that achieved by a more fundamentally scientific approach.

It would seem that we should take a positive stand and recognize full professional stature is possible whether we ascend to the goal of professional engineering by the production management or the scientific engineering route.

If any one of the curricula has acquired unessential subject material then we should be courageous enough to operate upon such a course program even if it is now accredited. Most curricula could be greatly benefited if we elevated the level of their fundamental substances both in the sciences and humanities.

Amrican Engineering Productivity Genius

The reputation of engineering education in North America has been established primarily on the productivity genius of our American engineering college graduates. Europe and Asia recognize us for this genius in production. A large segment of our registered professional engineers of the United States and Canada belong to the group of graduates who have earned their professional status by production, operation, construction or management.

In the area where Europeans and British engineers are the strongest, that is in the scientific phases of engineering practice, many of the managers of industry there report that such a fundamental science training for industrial production or construction should go no further than the Bachelor of Science level.

The British testify that the usefulness of the men who have advanced degrees in fundamental engineering science is not in the fields of production. They would recommend them to the government and industrial research laboratories primarily as researchers and technologists. This is largely due to the European program of advanced engineering education.

In North America it would seem that we could profitably reduce the number of undergraduate curricula leading to the Bachelor of Science degrees; then, for the advanced degrees, two paths might profitably be provided in *each* field of engineering to lead to a high level goal—the one in production, construction and operation, the other in engineering sciences and research.

By either path an understanding of the principles of management should be an essential part of a professional engineer's preparation. Management is a part of all walks of life where human beings must work together.

The work of the American Society for Engineering Education for the next sixty years should represent a fully rounded program of undergraduate and graduate study. The engineering sciences must be advanced in most engineering curricula, but this should not be at the expense of our accomplishments in industrial engineering and management. All Western Europe and much of Asia are determined to try to overtake us in industrial activity. We should not reduce our rate of advance-

ment in industrial enginering but raise the level of what we have in that field as well as direct our attention to new high levels of accomplishment in the engineering sciences.

The financial capital of the world has moved to the American Continent within the past two decades.

Those of us who have studied Europe at close range are convinced that the spiritual strength of America with its freedom of religious thought and action is much more virile and effective than that which prevails in nations that still stubbornly cling to state religions.

Nationally our march of progress should envision a nation growing deeper in its moral and religious foundations and fully capable of directing the distribution of our financial resources through a personnel well educated in the principles of science and engineering from the basic fundamentals to their various applications. These should be effectively applied to the management of men, the development of power, the utilization of materials, the communication of thought, the transportation of man and the distribution of his goods.

Our responsibilities to reach these goals would appear to be a most fitting challenge in the education of professional engineering for the next three score years. In our aspiration to work toward these goals may we keep the profession free; free to act, to think, to speak and to believe, so long as in these activities each member will remain true to the principles and within the framework of our American way of life.

Sections and Branches

The Spring Meeting of the **Middle Atlantic Section** of the ASEE was held on May 2, 1953 at the University of Delaware.

The morning general session was opened by David L. Arm, Dean of the School of Engineering, who introduced Dr. John A. Perkins, President of the University of Delaware. After the address of welcome, Dean Arm introduced Professor C. F. Bonilla, Chairman of the Section, who then introduced Dr. Jess H. Davis, President of Stevens Institute of Technology, whose talk, "The Contribution of the American Engineering College to American Industry and Culture," featured the morning session.

At the business meeting which followed the main talk, the minutes of the meeting held at Manhattan College were approved as was the financial report. Professor M. T. Ayers, Chairman of the Committee on Meetings, included in his report the notice that the Fall Meeting would be held at the University of Pennsylvania, December 5th.

The afternoon session was divided into the following group meetings:

(a) Educational Aspects of Engineering Research in Universities
(b) Services Offered by College Placement Bureaus
(c) Graduate Instruction by Means of Off-Campus Courses
(d) Undergraduate Statistical Training for Engineers
(e) Aids to Undergraduate Instruction
(f) Preparation Required in Engineering Drawing for Industry

Before dinner, President and Mrs. Perkins greeted the vistors at a reception given in Warner Hall. The University Glee Club furnished a musical interlude at the end of the dinner and previous to adjournment.

The Ladies' Program included a tour of the campus, lunch at the du Pont Country Club, and a visit to the well known Longwood Gardens. They returned in time to join with the men and attend the reception and dinner.

The following three papers were given at the ECRC General Session meeting at Gainesville, Florida, June 24, 1953 under the chairmanship of Eric Walker, Vice President of ASEE and Dean of Engineering, Pennsylvania State College.

Theme: Encouragement of Fundamental Research as an Aid to Education and Engineering.

Opening Remarks

By DEAN ERIC A. WALKER

Chairman, Engineering College Research Council and Vice President, ASEE

The Gainesville newspaper welcomed the American Society for Engineering Education and the Engineering College Research Council on the opening of our convention by stating, among other things, that the budget of the School of Engineering at the University of Florida this year amounts to $1.5 million and of this some two-thirds was devoted to research. This same ratio of research to teaching cost is being repeated in many of our engineering schools and in many cases the business of research is in danger of overshadowing the business of education. Research today is big business in the colleges as well as in the industrial world.

In this year of 1953, the United States will spend well over $3 billion on research and development, or almost one per cent of its gross national product. Of this money, the greater portion comes from the Government. In 1952, approximately $1.8 billion was so appropriated (mostly by the Department of Defense) and of this, $300 million has been identified as being allocated to the schools and colleges. Unfortunately, the figures are somewhat deceiving for about $180 million of this is spent by research institutes and large Government-owned but college-operated laboratories which have little or no connection with an educational function. This leaves about $120 million, which is spent in such a manner that it has an impact on the educational process. Its effect can be extremely important.

We are all well aware that there is a change in Washington in attitude towards Government spending and we are beginning to feel that there is a change in attitude towards research itself. In any event, we feel certain that the research and development budget is due for drastic cuts. This then raises the question as to how soon and where they will fall. The Government spends its research and development money in three large types of organization—industrial laboratories, laboratories that are Government-owned and operated, and universities. The types of research spent in each differ in important particulars.

The research done in industrial laboratories is often of a more practical nature, leaning towards development and often coupled with a specific weapon design and production. It seems fairly obvious that the Department of Defense will not cancel a research project which appears to be leading to a new weapon, especially a weapon for which there is an operational need and funds for its manufacture. This consideration alone will protect many industrial research contracts. The work done in Government laboratories is often that for which there is no industrial application or of the type which requires large, expensive proving grounds and other in-

stallations which have little industrial use. Such laboratories are staffed by civil servants and usually by their very nature laboratories of this type must be operated to keep them workable in case of emergency. These factors will give them considerable priority on Government research funds. This leaves the colleges as the easiest source of a paper saving. Some members of the Engineering College Research Council feel that we may have to bear the initial onslaught of such reductions. Such cuts will be very hard on the colleges for many, admittedly, have tooled up more than is wise and have made more commitments to personnel than they can carry if a sudden reduction should be called for. All of this risk has been accepted as part of a genuine effort to help the Government in time of emergency.

We note with some pleasure a shift to the more fundamental types of research in the colleges and we have been much pleased with the increased activity of such organizations as the Office of Ordnance Research of the Army, the Scientific Research Office of the Air Force, and the National Science Foundation, as well as the continued activity of the Office of Naval Research which has long been known as an ardent supporter of college work. It is our belief that the Armed Services and indeed the Government and industry receive a generous return for money spent on college research. Figures compiled on the cost of supporting a research worker show that in general a university researcher costs about half as much as one working in Government or in industry, and we like to believe he is just as productive.

Admittedly, there is one field in which the engineering colleges have not done their share and one in which the Engineering College Research Council is searching for ways to be more helpful. That is in providing research assistance and know-how for small industry. Some of us have been much impressed by the productivity of the American farmer which is far higher here (measured on a yield per agricultural worker basis) than in any other country. This fact cannot be divorced from college activity in agricultural research and the dissemination of the results of this work by pamphlets, meetings, and the spoken word to the individual farm operators. There are many small business men operating in this country without any such help or advice. Previous attempts to assist them by the engineering experiment stations, divisions of industrial research, and the Department of Commerce, have been too small to measure the beneficial effects. It is our belief that in this area lies one of the large opportunities for the engineering colleges of today.

Although there seems to be general agreement that engineering colleges ought to concern themselves only with the more basic types of research which lead to an advancement of the frontiers of knowledge, there are some members of the Council who feel this is a too narrow and restricted point of view. Their arguments run something like this: The profession of engineering is essentially concerned with the *creation* of new machines, systems, and materials which the people want. Therefore, the individual engineer must be creative and engineering teachers should, if possible, teach their students to be creative. This they cannot do without having a chance to practice creativity themselves. In other words, a teacher who is not creative cannot impart such knowledge to a student. Many engineering teachers practice creativeness by consulting; others by doing research. But should not a mechanism be provided for all engineering teachers to practice engineering? If this is so, is not the best way to do it to provide an organization as part of the engineering school, such as a division of engineering research which would provide room for practice? Such an organization might operate on similar lines to the clinics and hospitals associated with our better medical schools. I warn you that this is only preliminary thinking and the Council is not yet prepared to formulate a statement of policy

but these ideas are offered for your consideration with the hope that you will be stimulated to give some thought to this important problem.

It is with these facts in mind that we have assembled the three speakers who are here this morning, who can talk from three points of view—namely, industry, education, and the foundations, on the impact of research on education. The careers of these three men show strong similarities; all have taught in colleges, all have given part of their lives to public service, and all have been leaders in their own fields of science. I am sure you will find their remarks stimulating.

From the Viewpoint of the University*

By HAROLD L. HAZEN

Dean of the Graduate School, Massachusetts Institute of Technology

In preparing these remarks on Encouragement of Fundamental Research as an Aid to Education in Engineering, I found the subject somewhat elusive despite its apparent obviousness. On the one hand, there are probably few thoughtful engineering educators who disagree in principle with the implication of the program title that fundamental research can be an aid in engineering education. If so, why do we need to discuss it? On the other hand, the practice in many of our schools indicates belief that the principle is valid for some *other* school, but not for *ours*. Or the feeling may be that while good in principle, research is not possible for us. Or again, we may believe in it, and want it, but find that research doesn't come to us. How can we tackle this subject in such a way as to shed light on the possible achievement of an end that most accept as good?

As a starting point I should like to draw upon work of the ECPD Education Committee in its visitation and accreditation program. While the reports of its inspecting teams are strictly confidential, and for very sound reasons, I believe that I am violating no confidence if I give to you synthetic extracts from reports characterizing two strongly contrasting schools. In these, I shall by selection overemphasize the research aspect *per se;* nevertheless, evidence of creative professional activity is regarded as an important criterion of professional stature of the faculty.

In the report on School A we find: "I was impressed with the forward-looking spirit of the staff in the Mechanical Engineering Department. Three full professors are guiding active research projects. Professor Q's work in dynamic stresses is significant although his financial support is limited and space is at a premium. His experimental equipment shows a high ratio of ingenuity to cost, but the ABC Company has become interested in the work and is making a small grant for additional support next year. Several publications have come out of these and the other departmental projects in the past few years. Recently Professor S has been consulting for a small manufacturer on some very interesting problems of heat transfer and he has become a recognized authority in this area.

"These activities are reflected in the handling of the senior electives taught by these men. During the past three years the core courses in Mechanical Engineering have been critically reexamined and revised to build on the students' mathematics and physics more directly. Some of the senior laboratory work ties in with Professor R's project on fluid flow around hydrofoil surfaces. Laboratory equip-

*ECRC General Session ASEE Meeting, Wednesday, June 24, 1953.

ment is good though not elaborate, and shows ingenious adaptations to permit unusual measurements.

"While some of the staff are not active in research and are in fact devoting their energies largely to standard undergraduate teaching, one senses in the department an alertness to and appreciation of new developments in the field and a rigor of thought and fundamental approach to the undergraduate teaching that provide a good foundation both for the students who are going directly into industry and those who are going on to graduate work. Incidentally, last year several seniors went to graduate schools. This department appears to be in a healthy condition and is growing with the field."

The above are extracts from the one type of school, which we can call Report on School A. Let us now look at excerpts from the Report on School B: "This inspector was impressed by the spirit of undivided devotion to undergraduate teaching found uniformly among the staff of this department. The faculty members are close to the students. The department has high morale despite the seriously low salary scale that was marginally low even before the inflation of recent years.

"The inspector reviewed class outlines, sample problems, actual examinations and laboratory reports. Courses have conventional content and the textbooks are among those widely used.

"Teaching loads are heavy, running in the worst cases to 18 or even 20 hours per week, including some laboratory. The faculty almost uniformly commented that their teaching load kept them busy all the time, and that they welcomed summer teaching assignments as a means of supplementing the low salary. While several of the faculty are members of one or two professional societies, they seldom attend meetings and have taken no active part for several years. The institution finds it very difficult to pay the expense of having them attend professional meetings, though the policy is to do so if a faculty member has a paper to present. However, the heavy teaching loads and preoccupation of the faculty with purely undergraduate teaching largely preclude any other professional activity. One minor consulting connection is of routine character.

"Possibly as a consequence of this lack of professional activity on the part of the staff, the courses have changed very little in the past 15 or 20 years. The laboratory equipment while adequate for elementary routine experiments is sadly out-of-date. There was little evidence of interest or ingenuity to adapt equipment or to improvise means to enable students to explore at least in an elementary way the newer point of view in this area.

"All in all, the picture is one of devoted, even dedicated loyalty on the part of the faculty to the school, the students, and to their work. But the department contains no inspirational quality and is 20 years out-of-date. Some of its work is more vocational than professional in character. In its way the work is well done, but it lacks the forward-looking and scientific point of view, the stimulus of new ideas. The professional influence on students has a vicarious, once or twice removed, quality. Perhaps most serious is the apparent complacency with, or indeed unawareness of, this static state of affairs."

In these brief extracts I can only suggest the cumulative impression formed as one reads the entire report. While I have contrasted School A with School B, a comparable contrast sometimes appears between different departments in the same school.

Foundations for Professional Growth

Both schools, of course, have loyal groups of alumni and enthusiastic supporters among the nearby industries. Both have had little difficulty in recent years in placing all of their graduates. Yet one senses that the quality of foundation that has been laid in the students for future professional growth is widely different in the two schools and that the student who has the natural intellectual capacity and character for important pro-

fessional work has been short-changed in School B. Of course the vigor and capacity for adaptation of youth are such that later stimulus sometimes inspires an able student from School B to develop qualities of professional leadership. One cannot but feel, however, that although the student of School B, like the child who has been nurtured on an ill-balanced and vitamin-deficient diet, may ultimately succeed, he starts with a serious handicap.

Is research the only and magical difference between A and B? Will School B plus research equal School A? The answer is obviously "No." The difference is fundamentally the difference in men. Yet research is a very significant factor and the research spirit a vital factor of difference.

What can School B do about its situation if it wants to? The first requisite is the conviction of the administration, especially the top administration, that the school must provide in the educational diet some of the intellectual vitamins as well as the essential calories. The president or dean must infuse this conviction throughout critical spots in the institution. Such a conviction cannot readily be infused into the oldsters, with perhaps a few notable exceptions. We oldsters are usually nonresponsive if not indeed allergic to new attitudes. It is the younger members of the staff to whom he must turn for the responsiveness to the stimulus to do new things. The president or dean may, of course, pull in a key man from elsewhere as a dean or department head who has this forward-looking and creative spirit to build up the activities of which he is given charge. But the real working groups are almost inevitably found among the younger men.

In building up this spirit, it is vital to pick and back the right kind of young person for this job. One cannot pick him with certainty, but only with reasonable probability of success. This promising fellow is the obviously able youngster who has new ideas and can make them work. He has imagination, intellectual power and ability to produce. He is interested in students and teaching, but he is impatient with routine repetition of a set pattern as his entire diet. He insists on the opportunity for creative professional work.

But let's be frank with ourselves. Often this young person will be an uncomfortable fellow to have around. He has too many ideas for changing things. Many of these ideas will be wild and impractical, even as judged by the progressive minded dean. He will be impatient with the orderly processes of institutional routine. He will get people annoyed at him because in his enthusiasm he overlooks the fact that human individuals are involved, and that tact and consideration for the rights of others are required in the prosecution of even the best ideas. He will have the department head and occasionally even the dean in hot water because of his brash actions.

Furthermore his salary will be a real problem. The market price is high on this kind of man and the non-financial attractions of academic life, real as they are, have a limit as an alternative to salary. To get and hold this man requires breaks in the customary policy line. To do this without weakening the morale of the organization takes the measure of the president's stature and wisdom.

But in spite of all the administrative discomfort he is likely to bring with him, this young man is the essential element. Without him the strongest administrative desire for the creative spirit in his institution goes unsatisfied.

The second requisite for developing the research spirit is the opportunity for the staff to engage in such activities. This opportunity is expressed in several ways. Teaching loads must be moderate for the person who is to do creative work. The able young fellow with a provocative idea (or the older fellow, if he has one) needs support in the form of time, facilities, and usually a little money. These needs are normally modest, especially in the early stages of a project. Personal encourage-

ment and academic recognition are powerful.

This encouragement may have the appearance of special privilege to other members of the faculty, and indeed it is special privilege in terms of the undergraduate teacher carrying a heavy load of standard instruction. But with this special privilege comes a serious obligation to produce good work. The net result is a special responsibility rather than a special privilege.

In making the beginnings of a research activity, the important things are special facilities, a large amount of money, or imposing physical requirements. The vital thing is the able man with the creative spirit and the encouragement to him to do original work. This leads normally to interesting new results, to publication and getting known in the profession, and perhaps most important, to sharing with students an experience of exploration into new problems. Financial support for such work can often be obtained after a man has demonstrated himself to be productive.

Quality is Important

In such creative work, quality is very important, for this work enters competition for recognition on the national rather than the local scale. Such quality requires imagination, independent thinking and high intellectual standards. Intellectual hobnobbing with the mathematics and physics people is often very profitable, indeed even essential to the engineers doing serious research.

On cannot make good research by arbitrary assignment of faculty people to do it. Men with the native capacity and energy for such an endeavor are indispensable. But tying back to the theme of this meeting, it is just those who have this capacity and energy who can bring to a school the vital quality that inspires students with ideals and ambitions that go beyond routine competence.

How does all this attention to research aid undergraduate education in engineering? On the negative side, it interferes with such education in the minds of those who conceive such education as merely a careful indoctrination in elementary science and the well established—albeit sometimes musty—applications of this science in engineering. It breaks up the comfortable orderly pattern of a faculty community devoted exclusively to this type of teaching. It results in an apparently divided purpose in the professor and takes some of his time from his students and teaching. There is a measure of truth in all of these negative points, especially when one looks at them with a restricted outlook.

But the all-important point is that the opportunity to do some creative work amid congenial surroundings is one requisite for attracting vigorous, productive minds to teaching. This is the important idea, because great teaching results from the association between responsive students and able, scholarly and productive faculty.

One frequently hears that the researcher is not interested in students and neglects his teaching and at best gives his students desultory effort and attention. True there are such men, plenty of them, but the place for such a man is in the research laboratory of industry or the research institute; he is not the man for undergraduate teaching, at least of the usual sort.

There are people, however, and their number is not as small as many think, who find the life combining a substantial amount of good teaching and association with undergraduate students with reasonable opportunity to do original work to be a very attractive and rewarding type of life. If in addition some opportunity is included for graduate teaching and association with graduate research, the combination becomes very appealing to many able persons. I would emphasize again that the highest type of undergraduate teaching can be done only in an atmosphere that feels the strong influence of the creative men about whom we have been talking. If an institution has a good sprinkling of

these and they are given good support by the administration, the whole tone and stature of the institution are raised above that attainable with an undergraduate-teaching-only faculty.

There are, of course, other contributions made by good research activity in a school. It catalyzes the association of the faculty with others in the profession. It breaks through the ivory-tower isolation and makes the faculty members actual participants in the professional engineering world. This brings to the faculty and thus to the students the spirit of fresh thinking on new problems and courage to venture into new and unfamiliar areas. It leads to projects by which able students experience glimpses beyond present practice into future possibilities.

Closer Relations with Industry

Faculty research can also add to closer relations with industry. Many of us here who are still far from retirement recall the period when industry at large regarded as suspect—or perhaps more frequently ignored completely—the amusing but harmless ideas of the professor-researcher. There are some such industries today, but there are far more that think differently. These latter have seen enough examples of older industries being superseded as the result of some supposedly idle research to make them keep an eye to windward against a change in technological weather that may necessitate their changing course on short notice. Thus the area of common interest between forward-looking industry and the scientific or technological school engaged in even modest but good research has increased clearly in the last decade or two. The corresponding increase in interchange of ideas has been healthy for the schools, for industry, and for undergraduates.

Research activity in the engineering school inevitably gets the undergraduate program away from the flavor of 20 or 30 years ago, away from the back-country atmosphere where the model T is still regarded as modern transportation. Not that I would disparage the charms of the back-country. But when we are up in the back-country we wish to enjoy it for what it is and not delude ourselves into thinking of it as the modern industrial world.

I would not have the remarks of this paper berate the dedicated professor whose life work has been to lead generations of undergraduates toward wisdom and warm human experience as well as to teach elementary structures or thermodynamics. He has his place in the scheme of things and a worthy place. But the technological and scientific character of our time requires that he who would be a part of it should come under the influence as well of the dynamic, imaginative, scientific-minded teacher who is himself an integral part of the swiftly moving stream of technological advance.

Fundamental Research from Standpoint of of Industry*

By CARL F. PRUTTON

Vice President, Mathison Chemical Corporation

I am speaking to you today as an individual, and not as a representative of my employers or of the industry in which I am employed. My experience in industry of several years' full time employment gives me some small qualification for expressing some of industry's attitudes on this subject, but nearly three decades of

* General Session by the Engineering College Research Council, ASEE, June 24, 1953.

service in engineering education I believe qualifies me to speak with some justification on the subject under discussion. I will try to convey to you my ideas on the attitude industry has toward fundamental research in our schools and then how industry could help such a program.

Industry clearly sees several major reasons, from its own self interest, why it should encourage and aid an expanded basic research program in our technological institutions. First, through tremendous expansions during the last thirty years, industry has greatly enlarged its activities in applied research to solve its short-range problems and develop its new products and processes to a point where the accumulated basic scientific and engineering facts and principles available may not be sufficient to render such applied research highly effective. Industrial research laboratories are not the ideal locations for the conduct of this basic long-range research activity. Most industrial research laboratories find it difficult to obtain budgets for these long range fundamental studies which may not pay out for many years, if ever. I have no statistics at hand, but it is my estimate that such expenditures do not exceed five per cent of our U. S. industrial research expenditure. Industrial research has always relied upon the fundamental data and principles which have come largely from our schools and universities, but due to the greatly increased scope of our applied research and due largely to financial restrictions in our schools, this basic information is not being produced at the necessary rate. Although I do not wish to draw a sharp line between scientific and engineering fundamental research, basic investigations in engineering have been a fairly recent development in our schools and manpower involved is much lower than in the scientific fields.

Unless industry establishes separate laboratories for carrying on its fundamental research, it must encourage and aid in expansion of such activities in outside institutions, and as we will see later the only logical place for such work is in our schools of technology. Basic research must be conducted in an atmosphere completely different from the drive toward immediate results and short-range objectives found in industrial research establishments. It must be conducted under conditions where there is a minimum of secrecy and where open discussion of the research with all interested parties may be had. Such open discussions enable the researcher to obtain outside advice as well as to reduce the possibility of too much duplication of effort on the same problem. In industry, due to its secrecy in its applied research, competitive duplication is widespread and in many cases very desirable. In fundamental research the need for secrecy is not as great and since the results are published and discussed freely when the problem is solved, other laboratories are aware of which phases remain to be solved, and can therefore effectively avoid useless duplication of research effort.

The second major advantage industry can see in encouragement of basic research in our engineering schools lies in the improvement, through such greater activity, of faculties and of educational processes which will yield engineering graduates who are better trained for industrial leadership in the years ahead. American industry, and particularly the chemical industry with which I am connected, has since the early 20's become increasingly dependent, for its phenomenal growth and vigor, upon technically trained men. The policies and actions of such leaders in the efficient coordination of scientific, engineering, business and sales personnel into effective and efficient organizations have been the basis of such growth. Industry has recently experienced vast technological changes and as it looks ahead changing technology must be continuously met and problems solved rapidly. To continue its forward march, industry must produce new products and continue improvement and cost reduction on existing products and processes. Enlightened technically

trained leaders must be available in order that industry may meet these new conditions.

New Industrial Atmosphere

The chemical, electrical, electronic, and aircraft industries have led this technological advancement but even the most conservative of our industries has now awakened to the new industrial atmosphere. Inherent in this industrial revolution of the past several decades has been an increasing reliance upon research and development, not only for producing completely new products but also for improvement of manufacturing facilities and manufacturing techniques.

Our industrial managers of the future must fully comprehend the optimum methods for use and integration of research, development and engineering into the fabric of a company's activities, as well as have a knowledge of finance, production and sales matters. American industrial management is faced with the necessity of learning how to apply and effectively utilize large scale research as a major force in meeting the challenges of the future. In some ways the problem faced is similar to that which confronted allied military leaders in the last war when they had to learn rapidly the technique of utilizing airpower and armored ground units with conventional troops to meet the challenges of the new type of mobile warfare.

We will need in industry in increasing numbers technically trained manpower of highest quality for major responsibilities in management and in direction of research, engineering and other major divisions of industrial activity. Therefore, it is of vital importance that our technological education be fully adequate to meet these needs. Even in the fields of sales and production we must demand leaders who are research conscious, who have a full appreciation of the need for new products and new processes, and who will give fullest cooperation and aid in advancing these necessary industrial objectives. A sales production manager who does not welcome the opportunity of selling or manufacturing a new product, even with the inevitable hard work and difficulties involved, will retard the progress of his company. In the ranks of our research and engineering departments we are in particular need of men looking for new things instead of resisting change. Each member of the management team must fully comprehend and give efficient wholehearted support to this forward moving program in industry.

Higher education and particularly engineering education has therefore a tremendous challenge to modify where necessary its training from a memorization of past engineering methods and practices to adequate training in principles and practices which will prepare its graduates for effective careers in industry where change and improvement is the order of the day and past practices are discarded when superseded by better methods.

Education in engineering as in other fields is largely a matter of teacher and student, and deans, executive offices, fine buildings and campuses are secondary adjuncts. Without capable forward thinking and acting teachers, capable of original and independent thought, it is useless to hope that the students they train will develop these desirable qualities and thus be adequately prepared to meet the challenging industrial needs of tomorrow.

Qualities of an Ideal Engineering Teacher

During my many years in the teaching profession I have at many times attempted to define the characteristics and qualities the ideal engineering teacher should possess. By such definition I hoped at least to keep from making major errors in my own development, even though I realized that neither I nor any other teacher could meet in a superlative degree all of these requirements. At least this listing gave me a proper humility in my daily work.

First, he must possess a reasonably high intelligence and an active knowledge of his engineering field.

Second, he must have a full determination and desire to dedicate his life to the service of young men, their training for life and for active and creative careers. He must desire to reap his rewards largely through reflected credit from the achievements and qualities of his students. He must feel that through such activities his service to mankind is greatly multiplied by the productivity of his students. That in such dedication of his services to the best interest of the world, his rewards would be within himself rather than the greater honors and economic return he could enjoy in other occupations.

Third, he must not consider his students as a group, but feel a responsibility of bringing about in each individual the maximum development possible.

Fourth, he must perfect the educational techniques of the classroom, lecture room, and laboratory to a high degree.

Fifth, he must possess and be able to transmit to his students the desire and ability to attack and solve new problems. Keeping abreast with developments and planning in industry and education is a necessary activity in this field.

Sixth, he must develop a full appreciation of the psychology of young men and learn those techniques by which one could lead, inspire, guide, and direct when necessary, to develop in them those traits needed in their activities in later life.

Seventh, since courage and the ability to think and act independently are two very important traits of character to be transferred, he must himself not become a subservient individual whipped about by the regulations, administrative departments or red tape of a regimented educational organization.

Eighth, as a teacher of technology he must be completely unbiased, honest and fair in all of his dealings whether it be with scientific data, with individuals, with groups, or with new theories.

Ninth, he must develop in himself and transfer through his example and his teaching certain additional traits:

1. Industry, without which men of major abilities may become failures, and with which men of lesser attainments may reach great achievements.
2. Consideration of others, including the concepts of tolerance and charity.
3. A realization of the tremendous opportunities under our American system which, although it can be improved, is by far the best system yet devised by man.
4. Full appreciation of the cultural and religious aspects of living.
5. Patience and persistence in attacking problems and in dealing with individuals. Patience to employ modified repetition successfully in educational processes, a method which is essential in all types of teaching.

Teachers who maintain a reasonable and balanced research program or who maintain contact with active industrial research are more apt to have these leadership and teaching qualities than are those who confine their teaching to classroom activities alone. Although we need in our schools skilled teachers and lecturers who do not engage in research activities in certain fields of education, they must be kept to reasonably low numbers if engineering education is to be fully effective. At present, there is still too great a reliance by engineering teachers upon ultraconservative engineering practiees proven by many years of use and a firm resistance against new methods. Too often engineering courses are taught by men of faint imagination and ambition who resist the use of mathematics and science and who in their teaching force upon their students a blind memorization of formulae and acceptance of technical dogma. Very seldom will you find these traits in a faculty member who is conducting original research in his field.

Industry Vitally Interested

Industry is therefore vitally interested in the training of its future leaders and

believes that more fundamental research in the schools should aid in obtaining the type of teacher required, a high type of student, and an improved training of these better students to supply the forward looking industrial leaders of tomorrow.

Another reason for industry's support of expansion of fundamental research in our educational institutions is to decrease the likelihood of this function being taken over completely by the Federal Government with its many possible evils of Governmental control.

With greatly increased research activities by our Federal Government and the urgent need of research in our engineering schools, there is the possibility of direct or indirect control by politicians of our entire advanced educational system. This could have disastrous effects on both education and industry.

I do not have data at hand to give comparative dollar volume of educational budgets and research project budgets sponsored by the Government, but in many schools they are of similar magnitudes. Many educational institutions are quite sensitive to sums of money paid as overhead on research contracts, a subject which I do not have time today to discuss.

Any client who pays half of one's budget must be at least listened to with respect. The widespread support of research programs by many industries would greatly eliminate the chances of directive control by any group.

Teaching contracts or agreements for senior faculty members are always on a minimum term of one-year employment; therefore the uncertainty of receipt of Government contracts and the working under Letters of Intent create an unwholesome atmosphere for the campus. It is my hope that when industry does aid research in our schools, it will do so in grants covering three or more years to avoid these perpetual crises which are disturbing to educational personnel.

I have confined my comments to fundamental research since it is my opinion that applied short-range research does not mix well with academic procedures. Short-range research requires quick actions and quick results and does not brook interference from other activities. In an educational institution, *education* must come first and cannot be interfered with. Therefore I feel that if and when applied research is to be conducted, it should be handled by full time personnel in special laboratories or as in some schools by research foundations.

Major Interests

To summarize, industry has several major interests in promoting fundamental research activities in technical schools.

1. To build up our stock of fundamental knowledge in science and engineering so the applied research and engineering programs in industry may continue on on efficient expanding basis.
2. To improve training of technical students for management assignments in industry.
3. To make more diffuse the assistance received by technical institutions in order to prevent the possibility of complete monopoly by any organization outside of the university itself.
4. To improve its relationship with colleges and therefore receive more thoughtful consideration when graduating students seek employment.

Now let us consider if industry will be permitted to help and under what conditions and finally in what forms this help may be extended. In many of our states, laws of incorporation prevent contributions to educational activities of this type. Stockholders may also bring legal action to restrict such contributions. It is hoped that through test cases a more liberal policy may be adopted. In general, surveys have shown that stockholders are not averse to such contributions, but a minority if opposed could make such contributions very difficult. If and when major contributions may be made, it is quite certain that industry will establish effective means of distributing assistance where it

will do the most good. Even for present day limited assistance, such care is exercised.

Judge A. A. Stein, of the New Jersey Superior Court, recently handed down an important decision on the right of directors of a company to make contributions to educational institutions. Judge Stein gave a splendid exposition of not only the *right* of corporations to make such contributions, but also their *obligation* to do so. It is expected that further court decisions of this type may relieve Boards of Directors of their apprehension in making contributions for educational needs.

The methods of assistance which industry may employ vary widely and include:

1. Contributions on an annual basis to either a general unrestricted research fund for an institution, a department or even a teacher, which the school may use as it sees fit in research activities, laboratories, equipment, etc.

2. Contributions toward a worthwhile educational objective, connected with fundamental research, for example:

   (a) Research Fellowships for fundamental research
   (b) Establishment of research professorships
   (c) Assistance in establishing needed educational and fundamental research divisions
   (d) Sabbatical years for research men from industry

3. Loan of research equipment or reciprocal use arrangements with school.

All such actions will bring closer understanding between colleges and industry and in so doing will strengthen both.

Fundamental Research from the Viewpoint of the Private Foundation*

By JOSEPH W. BARKER

President Research Corp., New York City

It would be difficult to point out a period in the history of engineering education in the United States when the question of fundamental research was more pressing than it is today. How is it possible to make such a statement when the total volume of research in our educational institutions is at an extremely high level—possibly at an all-time peak? Why is the American Society for Engineering Education devoting an entire session to this subject when research is being so amply supported? Why are we worried and have we real reason for our worries?

I believe we have real and urgent reasons for our worries. Could we cast up a consolidated budget for all our engineering institutions, I believe we would find that research expenditures are accounting for about one third of our total expenditures. In discussing this point for *all* educational institutions, the Commission on Financing Higher Education on page 355 reported, "The total expenditures of higher education for *organized* (italics mine) research activities in 1950 amounted to $222,000,000 (of this $132,000,000 was government contract research). Thus, contract research was about 60 per cent of this total. If we add other federal funds for agricultural and medical research, we find that the federal government provided about 70 per cent of all income used to support this part of the work of higher education." Two

* Address given at the 61st Annual Meeting of the ASEE at the University of Florida, June 24, 1953.

points must be taken into account in evaluating this for our engineering schools. The first point is that the Commission is speaking of *all* higher education, and it seems obvious that proportionately higher relative amounts would prevail in the engineering and associated science departments of our engineering schools than in *all* higher education. And the second point is that the Commission included departmental and institutionally supported research under their accounting heading "Departmental Instruction and Research." What the proportion of those expenditures was for research is anybody's guess, and in our engineering school budgets, this research item under "Departmental Instruction and Research" will run proportionately higher than in *all* higher education.

Any such budgetary imbalance bodes trouble for our schools. Research, and I am at this point not differentiating between pure, applied, and development research, has become too large a proportion of our consolidated expense budget for any degree of comfort to our administrators. An additional cause for worry is the preponderance of government contract research in this total amount of research. Such contracts are dependent upon Congressional appropriations from year to year. There is and can be no assurance of continuity. All of us have had experience with sudden terminations due to lack of appropriations with all the sad effects not only on our financial commitments but also on staff morale.

Problem is Acute

This problem is peculiarly acute for our smaller institutions and without naming the school let me cite just one example. In March of 1953 President X wrote me that he needed to be able to assure the fourth man in one of his engineering departments of re-appointment for the coming scholastic year. The department has a teaching load requiring the full time of three and one-half men. The fourth man has spent approximately one half of his time supervising a government research project of fundamental character. I quote from President X's letter:

"The trouble is that we shall not get an answer from ONR until June or July and that is too late for a definite commitment to Professor Y. For his sake we need to fish or cut bait at this particular time. My request to Research Corporation is for a contingent grant of Z dollars which would be used in the event that ONR turns us down, but which would be cancelled if ONR sponsors this research."

to which I replied on March 5:

"Immediately upon receipt of your letter of March 3 relating to Professor Y's research project, I discussed it with our Division of Grants. We feel definitely that this falls without the realm in which we usually operate for precisely the reasons I outlined to you over the telephone. However, all of us agree that your problem is most pressing and since our Board of Directors has placed a small fund at my disposal for emergency and non-precedent forming experimental grants, our Grants Division agrees with me that it would be highly effective for me to make this grant from that fund. Consequently, I am enclosing our check drawn to the order of (your) college in the sum of Z dollars to be used for the purposes outlined in Professor Y's letter to you of February 28 and enclosed with your letter to me of March 3."

On March 9 President X wrote:

"We shall bank the check of Research Corporation and hold this sum pending the decision of ONR. If this comes through, we shall return the Z dollars to you—if not, we shall use it as outlined. I cannot tell you how pleased I am by this action which solves a very real problem for us. . . ."

In amplification of my letter of March 5, I wrote President X on March 12 as follows:

". . . I want to amplify that letter and strengthen what I had told you on the 'phone of our policy on grants.

"We have consistently denied applications for grants which contained in their budget any provision for payment of a stipend to a regularly appointed staff member. Our reasons fall under two general

headings. First, we consider our grants to be a provision for helping the research project in which the college is primarily interested as being a part of their educational program. If the college is not sufficiently interested in the project to make the time of their staff member available to conduct or direct the research, then we feel the project is not one for us to consider supporting. We never want a project supported by our grant to be pushing the institution into an area of work not consistent with their fundamental educational policy. Second, if we permitted charging the stipend or any part of the stipend of a regular staff member to the project, then we would put the college in the position of 'leaning on our grant as a crutch' to supplement their regular budget. When we had to refuse a continuation of the grant we would be placing the college in a difficult financial situation. But we must move our grants' help from institution to institution, considering them as catalysts to start the 'research spirit reaction' going, then moving to another, then another, etc. We have roughly $500,000 available annually for grants, and if we are to maximize our help to education in general, we cannot keep any sum constantly available to any one institution.

"I trust you see the general validity of our policy and I believe you will agree with its basic philosophy.

"Fortunately, our Board of Directors has shown its confidence in me by making a sum available to me as a 'President's Fund' to permit me to do 'experimenting' without setting precedents for our general policy. It seemed to me and to our Grants Division that this case was one worthy of 'experimentation,' so I made the grant chargeable to my fund. If you do not get the ONR contract, then I will have used up about one-third of my kitty for this year. But I was glad to be able to help you solve your emergency problem without casting overboard our general policy."

On June 1 President X wrote me as follows:

"We have just had final word from the Office of Naval Research regarding the proposal about which I wrote you some time ago. From conversation and previous correspondence we have the strong impression that this negative decision was reached as a result of the present economy mood of Congress combined with the fact that the research program is much more in the territory of basic research than of applied research.

"This means that we shall not be able to return to the Research Corporation your check for Z dollars which you sent in response to my contingent request. I am disappointed in this regard, for we had all been quite hopeful that ONR would come through. We shall keep you informed of the progress of the research, and Professor Y will file whatever reports you would like to have. Once again on behalf of the college I send you and the Research Corporation our warm thanks for your help."

On June 3 I wrote Professor Y as follows:

"I am sorry for your college that you received the negative reply from ONR on Professor Y's project. Our help simply postpones your staff problem for one year, as I see it. We are, however, glad we could be of assistance in the emergency.

"As to reports we ask only the very simplest. When Professor Y closes his project in June 1954, we would like to have:

(a) From your Treasurer or Comptroller a financial report showing how much was spent from our grant for—

1. Equipment
2. Salaries
3. Expendable supplies, machine shop work, etc.

(b) From Professor Y a brief report showing what scientific accomplishments were produced during the year and, if results are published, where, with two copies of the publication for our files.

"It has always been our policy not to require any detailed reports either financial or scientific. If the man and the institution are good enough for us to support, we expect they will treat our grant as if it came from their own endowment income. We want no vouchered accounting, we want no detailed research reports—we want to *help* not to complicate the college's problems."

On June 9 President X replied:

"I don't know when I have received a nicer letter than yours of June 3. We shall

provide the very simple reports you ask for, and I can assure you that these do not complicate our institutional life! Thank you not only for your help, but also for your understanding.''

To have quoted all this has taken time, but I think it illustrates most clearly several phases of the question before us—the problems of a small college arising from contract research; what happens when a professor's stipend and tenure become dependent on a contract renewal (or for that matter on a foundation grant), and lastly how a private-enterprise foundation can help a college in an emergency. Incidentally, it also emphasizes our Research Corporation philosophy of grants-in-aid of research. Parenthetically, I want also to emphasize that this action on our part was a *nonprecedent*—I would hate to have a flood of similar requests; I simply couldn't handle them as I did this one.

Another cause of our worries about research beyond the mere budgetary imbalance and the uncertainties of contract research support, arises from the very nature of the vast majority of research projects in our engineering schools. Because engineering is Applied Science, the natural tendency is toward applied or development research, thus leaving the vast majority of basic research to our science colleagues. But there is a real area of basic research in strictly engineering problems which should be undertaken by our engineering staffs. Here, it seems to me, is a real vacuum at the present time.

Contract Research

Contract research, particularly from the Defense Department, is and properly should be largely in the field of aplications and developments, dedicated to better weapons, etc., for defense of our country. Much, but fortunately not all, research conducted for industry in our engineering schools is also applicatory or developmental in character. If these projects crowd our engineering school research facilities and engage the major attention of our engineering faculties, there is little room for basic engineering research, which ought to be the primary objective in our schools.

From our experiences in Research Corporation over the past eight years of my presidency, we note other tendencies in the engineering projects submitted to us for possible support. First, "coefficient evaluation" seems to rank high in our engineering colleagues' minds as basic research. While we recognize the need for such routine investigations to improve our design formulas, I must admit such projects leave us cold and receive scant support from our Advisory Committee. They smack of "cook-book research" necessary to "improve the cake but hardly contributing to a better diet." Were bachelors' theses projects a requirement in our curricula and were these "coefficient evaluation" projects designed to support such work with a part-time scholarship to the seniors, I think they would receive more consideration at our hands. But as proposals for faculty research, assisted by graduate students, they hardly seem to contribute either to that "inspiration for better teaching" or to the "advancement of our knowledge of the unknown" which we believe are the essential aims of research in our colleges.

The second tendency we note in the projects submitted to us is the proposed purchase of large scale expensive equipment and instrumentation. It seems that we have forgotten how to conduct any experiments in basic areas with ordinary or improvised equipment and instrumentation. Of course the non-linear effect of scale factor is frequently large when we pass from ordinary laboratory to full size commercial equipment, yet it would seem that fundamental research could be at least originated and preliminarily investigated on a small scale with improvised instrumentation. Yet we find grant requests in engineering areas running from two thirds to three quarters of the original budget for "new equipment and instruments."

The third tendency we note revolves around "patent consciousness." This

seems to have been on the continual rise since 1946 and we believe is thoroughly detrimental to a proper faculty research attitude. This may be true for Research Corporation and not for other foundations because of our mutual agreements with many colleges for the handling by us of possible patents arising from staff research. We notice (or think we do) an apologetic attitude on the part of some engineering applicants saying for instance, "there seems, however, to be small probability of anything patentable arising from this proposed research project." Let me say as clearly and as positively as I can that any anticipated lack of potential patentability is absolutely *no* drawback, and conversely that undue attention to patentability *is* a drawback to our making grants. Research Corporation grants-in-aid of research are given to support extensions of scientific knowledge and for that purpose alone. In this connection also I ask that you remember the statement of our fundamental philosophy on grants which was contained in my letter to President X of March 12. It is so basic to our thinking that I will reread it.

Patents have an important place in our free-enterprise economic system. They offer a necessary and desirable incentive to creative invention and they offer the necessary and desirable protection to permit and encourage proper economic exploitation. *But* they should be and must be kept as the secondary aspect of college research. They, as well as contract research, must not become the tail that wags the dog.

With the exception I will cite later (when Research Corporation asks the institution and some staff member to undertake specific research) every Research Corporation grant is given with the full understanding that no patent strings are attached. The results of the research program are to be published for the information of all, and if any patent possibility should arise from the work, the patent is the property of the staff member and his institution. I cannot emphasize this too strongly for I hear occasionally from colleagues that they understand we claim all patent rights. This is just *not so*—we *disclaim* any rights whatsoever.

Patents from Staff Research

The obvious reason for this misunderstanding arises from the fact that many colleges have turned to us for help in handling patents arising from staff research. We have general patent management agreements with some 50 colleges under which the patents, if issued, are assigned to us and royalties are divided in agreed upon percentages between the staff member, the institution and us. After our expenses of administering these patents are met, our share can go only for the support of research since we are a foundation and have no stockholders.

There is one exception to the statement I made a moment ago, "Research Corporation grants-in-aid of research are given to support extensions of scientific knowledge and for that purpose alone." This exception is also contained in recent comments I made on the Preliminary Report of the Committee on Institutional Research Policy of the American Council on Education.

This Preliminary Report states five fundamental principles:

"1. All accredited institutions of higher learning subscribe with varying emphases to three primary and essential aims: (a) the *extension* of the boundaries of knowledge; (b) the *conservation* of knowledge already acquired; and (c) the *diffusion* of knowledge through sound teaching and other accepted methods of dissemination.

"2. A college or university may and usually does have additional objectives deriving from its character as a society of scholars, which may lead to other public services, but should do so to the extent that such service is compatible with its primary aims.

"3. The extension of the boundaries of human knowledge is accomplished primarily through basic research. The results of such research are made available through publication to the entire scholarly community; their validity is appraised through criticism and reexamination by competent colleagues.

"4. Applied research is necessary to human welfare. In an institution of higher

learning, however, it is particularly valuable if it tests the results, or stimulates the progress of basic research, or assists in the training of younger men and women, who must in the future carry on the research program.

"5. Classified research, which contravenes the diffusion of knowledge, is justified in a college or university only as a public service in emergency conditions because its faculty constitutes a society of scholars who have special competence in the given fields, and it should continue only so long and so far as the emergency conditions exist."

The Preliminary Report goes on to state under "Title III—Suggestions and Recommendations to Colleges and Universities," paragraph 5:

"The educational institution should carefully determine the entire cost to it of sponsored research, and if it accepts contracts that do not cover both direct and indirect costs, the institution should do so with the full recognition that it is itself making a contribution to the cost of the work. The present program of vast research expenditures on the part of the government could do serious damage to the economies of our colleges and universities if handled largely on a grant-in-aid basis without provision for indirect costs. The Committee believes that this is a part of a larger problem facing our colleges and universities, involving the acceptance of grants-in-aid from those foundations and other sources which at present do not pay the full cost of the projects they support."

Again under "Title VI—Sponsored Research and Foundations," paragraphs 1, 2 and 3 read:

"1. The Committee recognizes the great contributions which foundations have made through the grant-in-aid support of basic research, particularly the help they have given in 'grub-staking' new ideas and projects.

"2. While such grants-in-aid must continue to play an important part in the financing of research, the Committee feels that educational institutions should be mindful of the financial hazards involved in the uncontrolled acceptance of grants-in-aid which do not cover all costs. An institution can bankrupt itself by failing to recognize the cost of projects so financed.

"3. The Committee urges both educational institutions and foundations to review their policies with respect to grants-in-aid, giving particular attention to the need for provision for indirect costs in large grants. It sees much encouragement in the fact that a few foundations already have made grants which covered indirect as well as direct costs."

President Adams of the American Council on Education sent a copy to me saying:

". . . I would be glad indeed to have any comments which you may wish to make on this report.

"As the title indicates this report in no sense is to be considered as final conclusions but is meant to be provocative of comment and discussion. So far as we can determine it has certainly succeeded in these aims!"

I want to read my reply because it together with my statement of our philosophy of grants emphasized above puts our Research Corporation policy on record.

"The five 'fundamental principles' are excellent—no one could take *any* exception to them. *But* they are also the 'fundamental principles' of foundations such as ours established to further science. Yet, again and again throughout the balance of the report there is a tendency to lump 'foundations' with government, industry, etc. as causing financial problems to the colleges unless 'overhead' is charged on grants-in-aid. To this I take real exception.

"In fact, it would be only a very short step from the expressed philosophy of this report to say that the institution should charge 'Alumni Funds' with institutional 'operating overhead' because the Alumni Funds cause the institution to assume 'overhead' charges to expand their educational and/or research program as well as the 'overhead' of the Alumni Fund drive itself.

Overhead Charge

"Where my personal philosophy departs from theirs rests on the following point. *If* any outside organization—government, industrial or foundation—*asks* the institution to undertake a new, or revised, or enlarged function of education and/or research *then* a proper overhead charge seems justi-

fied and reasonable. Where, however, the *institution proposes* a program to the government, industry, or foundation for support, and where the proposed program is a proper element of already established areas, in which the institution is already active, then the inclusion of institution overhead becomes questionable. Should the institutionally proposed program be a large one which obviously would require considerably expanded costs, then I think the institution is justified in asking to include the additional overhead in its proposal. Where, however, the institutionally proposed program does not require increased overhead costs, I see little or no justification for asking the grantor to include a flat per cent overhead charge in its 'grant-in-aid.'

"Let me illustrate by two typical cases pertaining to Research Corporation. Professor X of Y College prepares a research project which is a part of the general activity of his department; he submits it to his Dean or President for approval before transmitting it to our Grants Division for consideration. His proposed budget may include (a) special equipment (or modification of existing equipment) needed to conduct the particular project; (b) supplies and expendable materials required; and (c) assistance (or fellowships) to help him prosecute the research. This is just the same as Professor X would propose were the project to be supported out of the institution's own research appropriations. In fact, if we make the grant-in-aid, our funds are simply *easing* the load on the institution's own expense budget—we take over that on which the institution would otherwise spend its own income. We even transmit the entire year's grant *in advance* with our approval of the project so that not only does the institution not have to use any of its funds (against later reimbursement) but actually has the use of our funds months in advance of its cash outlays on the project. *And* whatever instrumentation is purchased from the grant becomes the permanent property of the institution, publication is not only permitted but almost required and no patent strings are attached. How can any 'overhead' be justified by any stretch of the imagination?

"The second type is where Research Corporation asks Y College and their Professor X to undertake a specified research. For instance, when Dr. Kendall working under a grant-in-aid from us to the Mayo Foundation, and aided by Merck & Co. both by intermediates and Dr. Sarett's researches in Merck's laboratories, synthesized Cortisone from ox bile, it was apparent from the original efficiency of the approximate 36-step process that all the available ox bile in the world would not produce enough Cortisone to meet the then anticipated needs for treating arthritis. We *asked* Dr. Woodward at Harvard, among many others in other colleges, to drop what research he was then doing in the steroid field and undertake the 'complete' synthesis from some starter material in ample supply at low cost. *Now* Harvard would have been justified in asking Research Corporation, even though we are a foundation, to include in the budget for support of Dr. Woodward's research an item of institutional overhead. (Harvard didn't do so but that is beyond the point.) *We* were asking *them* to drop at least part of what Dr. Woodward was doing and to have him do something for us—to be sure for the suffering world also. We would have been willing to include a reasonable institutional overhead in the grant. These two cases illustrate where I think the dividing line can most reasonably be drawn."

This second type of research grant—where Research Corporation asks an institution and a member of its staff to undertake research on or development of a specific problem of vital interest to us because of our financial interest in a patent, is the one type in which we ask that any patents flowing from this later research or development shall come to us also for management with the basic patent. Of course, both the institution and the staff members associated with this later program would share in due proportion with the original inventor and his institution in the combined royalties, should applicable patents flow from their research or development. I must add, however, that this type of grant is a very unusual one with us and arises only occasionally.

Summary

To sum up then, I believe that the "Five Fundamental Principles" of the ACE Preliminary Report should become the guide signs for our institutions in con-

sidering the problems of research. I believe that we must press as rapidly as world conditions permit to a rational balance between contract applied or development research and basic research. I believe each institution must make a self-evaluation of just how much research it has the equipment, space, and staff to conduct and how much it can afford to permit being conducted within its walls. I believe research and teaching must be a balanced ration.

I believe that our educational institutions must press for adjustments in the personal and coporate income tax laws. The flow of gifts to endowments has not been great enough to overcome the reduction in interest rate on invested endowments, to cover the decrease in the purchasing value of the dollar, to cover the increased student load on the institutions, and to leave a sufficient margin over the purely instructional costs to permit adequate research support. To continue to accept classified government contract research beyond the "public service in emergency conditions" as a means of carrying institutional overhead would be just as bad as accepting outright government subvention of education.

The institution must remain the "major partner." It must be prepared to accept or not to accept contract research of any description whenever, except in "emergency conditions," it believes the long range best interests of education will be best served thereby. Financial freedom is just as important as Academic Freedom.

And finally, our institutions should look principally to our private enterprise foundations for support in "grub staking" new ideas and projects as so excellently stated by the ACE Preliminary Report. To this I would add in catalysing the research to a point where the institution can secure public support for continuation of the work. Foundation support through grants-in-aid should be a supplement to research appropriations from endowment income and not a crutch with which the institution limps through one of its "three primary and essential aims—the extension of the boundaries of knowledge" to quote again from the ACE Report.

It would be fatal to the proper research attitude in our educational institutions if all research were supported by either government, industry, or foundations. The institutions must be free of even that modicum of control which comes from submitting for support their research projects to outside agencies, even eleemosynary foundations. And the greatest danger of all would be to have only one agency from which outside support could be sought. That is the certain road to loss of freedom.

College Notes

Dr. Gaylord P. Harnwell has been elected President of the **University of Pennsylvania.** As President, he will succeed Harold E. Stassen, who resigned January 19 to become Director of the Mutual Security Agency. Since that time, William H. Du Barry, Executive Vice President, has been Acting President.

* * *

Kurt F. Wendt, Professor of Mechanics and since 1948 Associate Director of the Wisconsin Engineering Experiment Station, has been named Dean of the **University of Wisconsin** College of Engineering by the UW Board of Regents. Wendt succeeds Dean Morton O. Withey who retired July 1. The regents also named Prof. William R. Marshall Jr., now Associate Professor of Chemical Engineering, Associate Dean of the College of Engineering and Associate Director of the Wisconsin Engineering Experiment Station.

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Report from the Committee on Society Finances of ASEE

The following report of the ASEE Committee on Society Finances with respect to individual dues was adopted by the General Council on June 26, 1953, with the recommendation that it be published in the JOURNAL and that a letter ballot be mailed to the Society membership.

To: The Members of the Society

Gentlemen:

Your committee has been exceptionally busy for a considerable time examining into and studying carefully the accounts of income and expense of the Society. It became evident quite early that the ASEE would soon be facing a serious situation. It is estimated that as of June 30 this year the deficit would exceed $1000. When we considered next year's budget and pared it down to what we considered to be the bare minimum of operating expense, the deficit would be about $4000. The Society does have a reserve, but we recommend against any reliance on this reserve for future use.

A thorough examination of the dues structure reveals the following. Up to 1929 dues were $4.00 for individual members; in 1929 the dues were raised to $5.00 and in 1946, when the name was changed to American Society for Engineering Education, the dues were fixed at $5.50 for librarians and grades under associate professor; $6.00 for associate professor and $7.00 for all others. It is estimated that the average dues for the entire Society from individual members is approximately $6.25. You will note therefore that there has been an increase from 1929 to the present time of $1.25. We think you will agree with your Committee that there has been most excellent management of the funds of the Society. Additional funds from advertising in the JOURNAL and the money received from Institutional, Affiliate and Associate members has enabled the Society to function successfully. Your Committee recommends that the steps taken recently to increase the number of Associate members be continued.

We have examined the income, expense and cost of publication budgets for the last eight years. It is worthy of note that in 1944–1945, the cost of publication of the JOURNAL was $9549. In 1952–1953, the cost was $26,459 without any increase in paging. It is further estimated that the cost for the coming year will be approximately $30,000 with little increase in service to the members.

The accompanying graphs are of interest showing the change in income and expense over the years.

As a preliminary statement your Committee suggests two classifications of individual memberships divided according to age and that the age of 35 years be the dividing line. This corresponds to the division for young engineering teachers. The cumbersome method of changing dues according to rank has made for excessive clerical cost and that method has not proven satisfactory and should be abolished.

Your Committee recommends that an increase in individual dues be requested in accordance with Article XI, Section 2 of the Constitution of the Society and further that the By-Laws of the Society be amended in conformity with the wishes of the membership as determined by letter ballot of such membership. Your Committee is of the opinion that the annual

dues should be determined by vote of the General Council of the Society at a regular meeting at which the budget for the following year is also adopted. The dues, however, should not exceed $10.00 per year for members above 35 years of age nor $7.00 per year for those whose age is 35 years or less. Since the fiscal year of ASEE starts on July 1, a member would be eligible for the lower dues rate in a given year if his 36th birthday had not occurred prior to July 1 of that year.

The Committee suggests that the ballot contain the statement that the dues may be adjusted in accordance with the needs of the Society, but not to exceed the above ceilings on recommendation of the Budget Committee and by vote of the General Council of the Society at a regular meeting. For the coming year, 1954–55, it is estimated that the dues would only need to be $6.00 per year for those under 35 years of age and $8.50 per year for those over 35 years.

THORNDIKE SAVILLE
S. C. HOLLISTER
F. M. DAWSON, *Chairman*

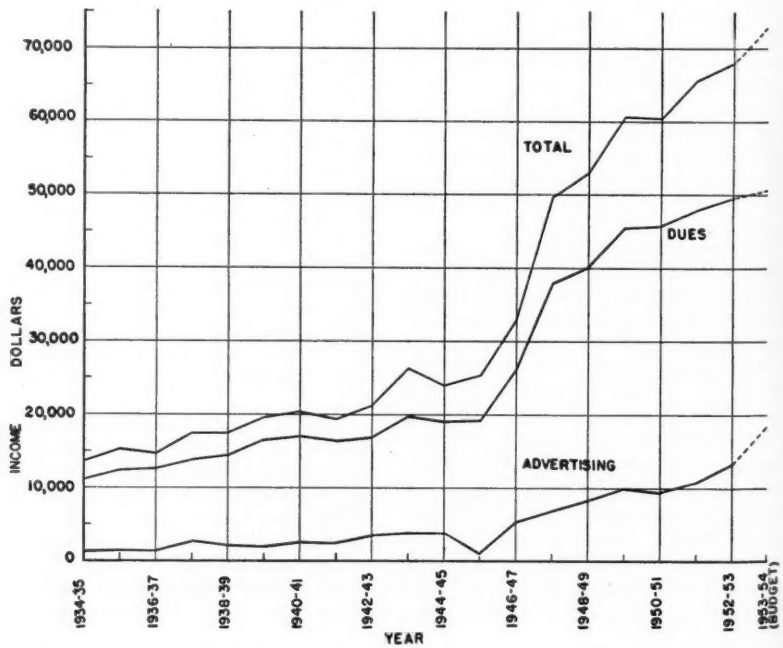
Other Pertinent Society Information

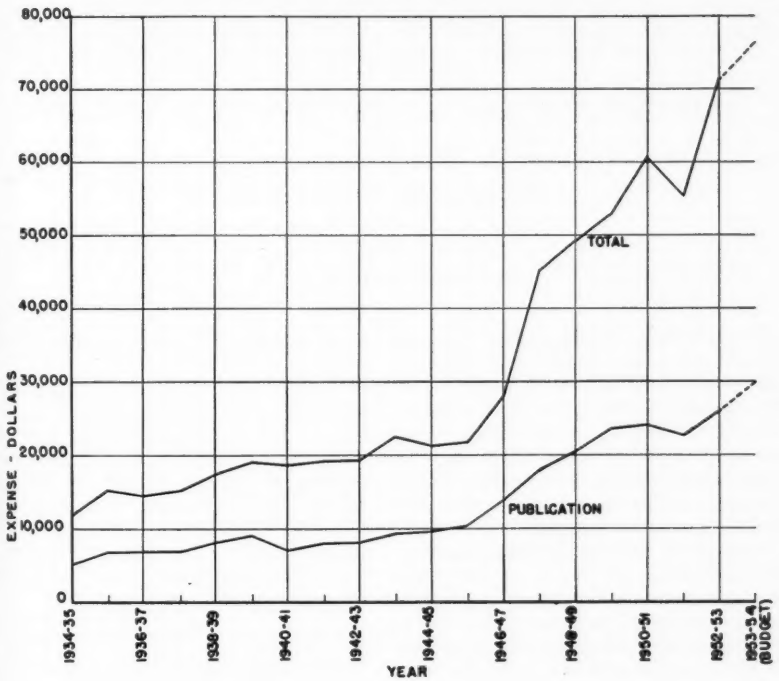
1. The Society membership has approximately doubled since 1945.

2. The cost of operation of the Society per member has been substantially constant since 1945. During this time the cost-of-living index has approximately doubled.

3. ASEE dues per member are about one-third of those of other national engineering societies.

4. In 1945–46 the reorganization of the Society resulted in substantial enlargement. At that time the Engineering College Research Council and Engineering





College Administrative Council were created. The General Council was enlarged and the Society took on new functions.

5. The ASEE headquarters staff now includes five people, a secretary, a part-time editor and three office secretaries. This is equivalent to one staff member for every 1,500 members. Other national engineering societies employ approximately one staff member to every 300 to 400 members. Additional staff is urgently needed, but present finances will not allow staff additions.

6. The ASEE is endeavoring to assume its share of obligation in the Engineers' Council for Professional Development, the Engineers' Joint Council and other organizations coordinating the activities of the engineering and educational professions.

Summer Schools for Engineering Teachers

Sponsored by The American Society for Engineering Education

By B. J. ROBERTSON
Vice President ASEE, 1947–50

Three groups of engineering teachers arrived on the campus of Dartmouth College several days before the beginning of the Annual Meeting of the American Society for Engineering Education which was held there last June. They came to attend three separate Summer Schools for Engineering Teachers to be held under the auspices of the A.S.E.E.

One school was for Sanitary-Engineering Instructors. It was sponsored by the Civil-Engineering Division of the Society with the co-operation of the United States Public Health Service and the American Public Health Association. Another was devoted to the discussion of Teaching Electrical Fields and Circuits to Undergraduates and was sponsored by the Electrical Engineering Division of the Society. Teachers of Engineering English who spent three days discussing the Orientation of the New English Teacher made up the third group.

Did you say unusual!, unique!, how interesting! ? They were interesting for those who attended but are not unusual or unique for members of the A.S.E.E., for such schools or conferences have been operated by the society since 1927. If you read the April 1952 issue of the JOURNAL OF ENGINEERING EDUCATION, you would have noticed that a Summer School for Teachers of Surveying was to be held at the Summer Camp of the University of Illinois located in the Chippewa National Forest near Black Duck, Minnesota. The total cost of sleeping accommodations and meals at this camp was estimated at $25.00 per person for the week.

Society-sponsored schools were held each year from 1927 to 1934 and from 1947 to the present time. The war and the accelerated programs for the veterans overshadowed any thought of summer schools for twelve years. Instructors had no time available for attendance and housing facilities formerly used for summer-schools registrants were in use all summer by regular students.

The Origin of the Summer School Idea

The origin of the summer school movement dates back to the Investigation of Engineering Education made by the Society for the Promotion of Engineering Education, now known as the American Society for Engineering Education. Six years—1923 to 1929—were spent in gathering data for this report which was published in two volumes totaling some 1600 pages. The survey covered schools in the Old World as well as in the New, and Technical Institutes as well as Engineering Colleges.[1]

The director of the investigation, the late W. E. Wickenden, for many years President of the Case School of Applied Sciences, brought back word of the summer schools being conducted in England for teachers in Technical Institutes. Describing these schools, the Report of the Investigation states:

[1] Vol. II, Report of Investigation of Engineering Education, page 244.

. . . "To aid in broadening their educational outlook and to give them the aid of intensive coaching on teaching materials and methods, the National Boards of Education have established summer schools which meet annually for a period of three weeks. . . . The tutors are the most distinguished university Professors of Engineering; and the lecturers, as a rule, are men of special prominence in public, industrial and educational life. While the aims of the summer schools established in the United States by the Society for the Promotion of Engineering Education are somewhat different, the inspiration and the original model for the undertaking must be credited to the schools of Birmingham and Oxford."

The American Version of English Summer Schools

The American version provided schools for faculty members of engineering colleges with no restrictions on attendance except a limitation on the total registration at any one school. Neither college administrations nor Government agencies exercised any authority over them. In England the registrants were selected by the heads of the schools and the National Boards of Education controlled the schools. In America, a seminar type of instruction was advocated with emphasis upon informal personal contact between well-known profesors and humble instructors. Writing in the S.P.E.E. JOURNAL OF ENGINEERING EDUCATION, President Wickenden summarized the objectives as follows:

"A group ought to take some division in the curriculum and explore it, both to survey its content, its new frontiers and to see how it borrows from and contributes to other divisions of study.

"They need to appraise its values to different groups of students, to examine critically the different methods of presentation in use; to work up and try out unit assignments and projects for students and test various methods of measuring the student's progress and attainments; to survey alternate problems of research and to map out programs of original work for themselves.

"Some men in the group ought to be the ablest teachers in the subject, men of mature years to serve as leaders in the group; some ought to present subjects which are closely related to the principal one under study; some ought to be detached enough to make good critics; but most of the group ought to be young men struggling with teaching problems and having the strongest possible incentive for the success of the effort. There ought to be some good teaching, but no sharp distinction between teachers and taught.

"The principal thing however is that they get together and work out the problems systematically, intensely, and enthusiastically."

The First American Schools

The idea appealed to American Engineering Instructors and they went to the Carnegie Corporation for financial aid in establishing Summer Schools for Engineering Teachers in the United States. The Corporation advanced $7500.00. Professor H. P. Hammond—now Dean of Engineering Emeritus at Pennsylvania State College—was placed in charge of the program. This was in 1926. Two schools for teachers of Mechanics were set up for the summer of 1927: one at the University of Wisconsin and one at Cornell University in Ithaca, N. Y.

The subjects discussed were:

A) The Teaching of Analytical or Pure Mechanics.
B) The Teaching of Applied Mechanics in Related Fields.
C) The Exposition of Methods of Teaching in General.

Announcing these schools Dean Hammond said: "The bringing of groups of the ablest and most promising younger teachers into contact with leaders having different points of view and different methods of presentation with adequate opportunity for free discussion promises a forward step in methods of teaching, in developing and holding the interest of the student and putting new life and inspiration into the department of engineering education."

Names well known in the engineering teaching profession were prominent in this first program—Timoshenko, Karapetoff,

Boyd, Poorman, Upton, Leutwiler, Moore. The registration fee was $10.00, room and meals about $15.00 per week. The school ran from 8 A.M. to 12 noon, from 2 P.M. on and again every other evening. One registrant complained that the sessions were so long that there was no time for the recreation planned. He should have realized that this is the rule rather than the exception in engineering meetings. Another wrote: "Enough men for inspiration not enough to make discussion difficult." Another commented: "The lectures from which I got the most profit were those that went somewhat over my head. The result was to increase my determination to increase the distance between my knowledge of the subject and what I try to give the student."

Professor Karapetoff gave a Piano and Cello Concert as a part of the entertainment on one of the free evenings at the University of Wisconsin. Staff and students were housed together; many became fast friends. Forty-one people were enrolled at each of the two schools. About one-third were professors and associate professors, one-third assistant professors and one-third instructors. Twenty-three leaders or lecturers took part, sixty-four institutions were represented.

Growth of the Summer Schools

These two schools were so well thought of that two more were organized the next year, one for teachers of Physics and one for teachers of Electrical Engineering. The schools soon became self supporting; leaders and advisors became so convinced of the value of the contribution to Engineering Education that they donated their time. Some institutions paid all or part of the expenses of their faculty members, perhaps the majority, of the registrants came entirely at their own expense.

It became increasingly difficult to hold the registration down to a point where intimate contact between staff members and students could be maintained. When a new school in a field previously covered was planned, those who attended the first one wanted to come again. They wanted to contact the friends they had made in previous years and to discuss the same questions in the light of additional experience.

Ninety-eight registered at the Mechanical Engineering School at Purdue University in 1929, including three Deans of Engineering. Three days were spent in Chicago where they met men from industry and listened to their ideas on what should be expected of Mechanical-Engineering graduates.

The Civil Engineering Division planned a three-weeks school at Yale University for July 1930. In March there were fifty-two applications and they were unable to keep the final registration below 100.

In 1948 one hundred ninety-nine teachers of Chemical Engineering convened at the University of Wisconsin. Many brought their families to enjoy the Wisconsin lakeside; this brought the total attendance to 396 persons. Yet there seemed to be complete satisfaction on the part of those attending. A large gathering can be effective if some sessions are divided into smaller groups.

When the engineering colleges began to include the Humanities and Social Sciences in their curricula, teachers of these subjects were confronted with new problems. The principal interests of these students were in a different field and the time available too short to allow the effective use of customary material and teaching methods. Interested faculty members and administrators formed the Humanistic-Social Division of the society. In 1950 it held a summer school immediately after the National Meeting at Seattle. A second school was held in connection with the annual meeting of the society at East Lansing, Michigan.

The Integration of the Teaching of Humanistic-Social Studies with the Teaching of Science and Engineering through (1) values and (2) methods of teaching and thinking was the theme of the first school. Courses in Psychology, Economics, Morals and Ethics, Music, etc., designed especially

for engineers and methods of presentation were discussed at the second school. Thus the summer school seems to broaden its scope to keep pace with changes in Engineering Curricula.

The application of fundamental principles to the solution of typical engineering situations has long been an important part of the Advanced Engineering Program provided for its employees by the General Electric Company. Most engineering teachers will admit that their graduates are not able to deal with new situations on their own initiative and from the standpoint of fundamental principles. They will also admit that attempts to overcome this deficiency by college faculties have not been overly successful.

The A.S.E.E. Committee on Improvement in Teaching suggested that the philosophy and methods used by the General Electric Company might be applied by faculty members in some of their regular class work. The company was approached and agreed to conduct a summer school for engineering teachers to demonstrate its approach to the problem.

Registration was limited to twenty-five teachers of either Electrical or Mechanical Engineering between the ages of twenty-five and thirty-five years; Deans of Engineering were asked to nominate one candidate each. Those attending were treated as though they were company employees —were required to do the same evening work etc.—but the course was abbreviated because of the time available. The school was held on the campus of Union College June 16–21, 1952. Registrants were housed in a campus fraternity house; all expenses including travel were paid by the General Electric Company. Thus Industry shows a definite interest helping teachers who wish to improve their technique.

Since the movement started, thirty-one summer schools have been conducted by fourteen divisions, one section and one committee of the society.

Administration Officers
- 1933 University of Wisconsin

Civil Engineering
- 1930 Yale University
- 1952 University of Illinois (Summer Camp)
- 1952 Dartmouth College

Chemical Engineering
- 1931 University of Michigan
- 1939 Pennsylvania State College
- 1948 University of Wisconsin

Committee on Improvement in Teaching
- 1952 Union College (General Electric Company)

Engineering Drawing
- 1930 Carnegie Institute of Technology
- 1934 University of Wisconsin
- 1951 Michigan State College
- 1952 Dartmouth College

Engineering Economics
- 1932 Stevens Institute of Technology
- 1934 Stevens Institute of Technology

Engineering English
- 1932 Ohio State University
- 1952 Dartmouth College

Engineering Mechanics
- 1927 Cornell University
- 1927 University of Wisconsin
- 1950 Iowa State College

Electrical Engineering
- 1928 University of Pittsburgh
- 1952 Dartmouth College

Humanistic-Social
- 1950 University of Washington
- 1951 Michigan State College

Mathematics
- 1931 University of Minnesota

Mechanical Engineering
- 1929 Purdue University
- 1947 Northwestern University
- 1949 Rensselaer Polytechnic Institute

Mining and Metallurgy
- 1933 University of Wisconsin

North-Midwest Section
- 1950 University of Minnesota

Physics
- 1928 Massachusetts Institute of Technology

Thermodynamics
- 1951 Michigan State College

The following reports were received on Summer Schools held last summer:

The Industrial Engineering Division held its first Summer School for Industrial Engineering teachers prior to the annual meeting at Gainesville, Florida, in 1953. The theme for the school was "Quantitative Measures in Industrial Engineering." Eleven speakers presented concentrated reports on the recent developments in and the applications of quantitative measures to industrial engineering problems. Each speaker confined his report to a specific subject area.

Thirty-three industrial engineering teachers and industrialists registered for the summer school. The attendance represented a good cross-section of the nation, both in geography and in interests. Those in attendance participated wholeheartedly in the discussions following each paper. It was more difficult to stop the discussions than to initiate them. Interest was high, and the exchange of ideas was undoubtedly of great value to those in attendance.

Comments following the summer school session indicate that those in attendance generally considered the session worthwhile and a success. In addition to being brought up to date on research and developments, the attendants engaged in a critical self-analysis and self-appraisal which will lead to more unified concepts of the profession. Objectives of industrial engineering education were defined and analyzed, which can only lead to improvement in course offerings.

For the second consecutive year, the ASEE and the General Electric Company jointly sponsored a seminar on teaching methods. This seminar was held June 15 to 20 on the campus of Union College in Schenectady, New York. The ASEE was represented by Dr. B. R. Teare, Jr., Dean of Engineering, Carnegie Institute of Technology, and Mr. R. W. McFall, Manager, Technical Education, represented the General Electric Company. Twenty-six colleges from all parts of the country were represented at the seminar. The week was largely devoted to studying the educational techniques used in the General Electric Advanced Technical Programs, and evaluating their effectiveness for undergraduate academic teaching. One of the techniques presented was "learning by doing." In studying this technique, the visiting college instructors actually assumed the role of students.

The Future of Summer Schools

There has been a tendency in recent years to shorten the length of the summer school session and to hold a number of them at the place of the Annual Meeting of the Society for several days preceding or following the annual meeting. This reduces the expense to the registrants and makes it possible to attend both gatherings. Many would find it inconvenient or impossible to attend both meetings otherwise. Shorter sessions mean that the discussions in the school will be restricted to some specialty in the division. Sanitary Engineering only was discussed at the three-day Civil Engineering school at Dartmouth College this year.

Schools are sometimes desired at locations quite removed from the Annual Meeting. A school may be located at some central point for those expressing an interest in the subjects to be discussed. Such schools have operated for at least a week. The school in Engineering Mechanics was held at Iowa State College in September 1950; the Annual Meeting was held in June at Seattle, Washington.

Schools are initiated by some division, committee or section of the society that wishes to do so. Arrangements are made with some university or college to act as host and a preliminary program is set up. Application is then made to the secretary of the A.S.E.E. who presents it to the executive board for approval and allocation of funds necessary for the preliminary work in organizing and publicizing the school. Summer schools have been self-supporting ever since the first one financed by the Carnegie Corporation and there is no record where any funds advanced by the society have not been returned. Most

schools do not request funds underwritten by the Society.[1]

There is no conflict or relationship between these meetings and those of the technical engineering societies such as the American Institute of Electrical Engineers, or the American Society of Civil Engineers. The discussions are limited to the place of technical material in college courses and methods of presenting it to the students.

The growing complexity of modern engineering requires constant changes in curricula. More effective teaching or an increase in the length of the undergraduate courses seems necessary; perhaps both will be required. The American Society for Engineering Education has had a division of Educational Methods for some time; special committees on Teaching Aids and on Improvement in Teaching have been very active in recent years. The summer school provides a channel through which the work of these committees can be presented to individuals for intimate discussion, generally with profit to the experienced professors as well as the beginner. There are unlimited opportunities ahead for this very effective means of improving the preparation of engineering graduates for their life work, Thé Summer School for Engineering Teachers.

[1] Members interested in starting a summer school should write to A. B. Bronwell, Secretary A.S.E.E., Northwestern University, Evanston, Ill., for detailed information on procedures.

Sections and Branches

The **National Capital Area Section** held its Annual Meeting May 9, 1953 in the newly dedicated Engineering and Architecture Building, Howard University. The members were welcomed by Dr. Wm. Stuart Nelson, Dean of the University.

Carrying on the theme for the year, the topic for the morning session was "Effective Utilization of Engineers in Industry." Vice-Chairman Walther introduced the moderator of the panel: ASEE Vice-President M. M. Boring, General Electric Company; and the panel members: David L. Arm, Dean of Enginering, University of Delaware; Arthur F. Hartford, E. I. du Pont de Nemours Company; Harold Goldstein, U. S. Bureau of Labor Statistics.

The afternoon session was in charge of the Chairman of the Section's Committee on Young Engineering Teachers, Professor Ojalvo. He called on the Section Chairman, Dean Downing, to present the prize for the winning paper to its author, Assistant Professor John L. Artley, Johns Hopkins University. Following this, Professor Artley presented the highlights of his paper.

Chairman Downing conducted the annual business meeting during which the following officers were elected for 1953–54:

Chairman: Carl H. Walther, George Washington University
Vice-Chairman: J. C. Michalowicz, Catholic University of America
Sceretary-Treasurer: M. S. Ojalvo, University of Maryland
Council Representative: Henry H. Armsby, U. S. Office of Education (continuing for second year of his term).

Following the meeting there was Open House in the Engineering and Architecture Building for inspection of the new facilities.

ASEE-ECPD Conference Program

Wednesday, October 14, 1953

(Meetings on October 14 are Committee meetings open only to persons designated.)

Time	*Meeting*
8:00 A.M.	ASEE Executive Board Meeting (Breakfast)—Grill, Engineers' Club
10:30 A.M.	Meeting of ASEE Executive Board with Chairmen of ASEE Divisions and Members of General Council of ASEE representing Divisions—ASCE Board Room, 15th Floor, Engineering Societies Building.
12:00 Noon	ECRC Executive Committee Meeting (Luncheon)—Dining Room, Engineers' Club, 10th Floor.
2:00 P.M.	ASEE General Council Meeting—ASCE Board Room, 15th Floor, Enginering Societies Building.
6:30 P.M.	ASEE General Council Dinner and Meeting—Special Dining Room, 10th Floor, Engineers' Club.

Thursday, October 15, 1953

The following meetings and luncheon, sponsored by the ECRC and ECAC, are open to all ASEE and ECPD members and representatives.

9:30 A.M.	Keystone Room, Statler Hotel, N. Y. C. Theme: Creativeness in the Arts. Eric A. Walker, *presiding,* Vice President of ASEE. In Music. Virgil Thompson, Music Critic, *New York Herald Tribune.* In Painting. John Ferren, Internationally known Painter. A noted speaker will also be obtained to discuss creativeness in poetry.
12:30 Noon	Luncheon—Georgian Room, Statler Hotel, N. Y. C. L. E. Grinter, *presiding,* President of ASEE. A Psychologist Looks at Creativeness, Its Environment and Its Measurement by Morris I. Stein, Professor of Psychology, University of Chicago.
2:00 P.M.	Keystone Room, Statler Hotel, N. Y. C. Theme: Creativeness in Engineering. W. L. Everitt, *presiding,* Vice President of ASEE. The Enginering Point of View. Maurice Nelles, Director, Borg-Warner Laboratory. The Industrialist's Point of View. Fred Olson, Vice President for Research and Development, Olin Industries.
6:30 P.M.	ECAC Executive Committee Meeting (Dinner)—Manhattan Room, Statler Hotel, N. Y. C.

Preliminary Program for ECPD Annual Meeting

Friday, October 16, 1953

The following meetings, luncheon and dinner are open to all ASEE members.

Time	*Meeting*
9:30 A.M.	Public meeting—discussion on accrediting. Hotel Statler, Georgian Room (under auspices of ECPD Education Committee).
12:00 Noon	Hotel Statler—Development of the St. Lawrence Seaway by General A. G. L. McNaughton, Chairman of Canadian Section of International Joint Commission.
2:00 P.M.	Symposium on Supply and Demand for Engineers—Hotel Statler, Georgian Room (in cooperation with the Engineering Manpower Commission, EJC).
7:00 P.M.	Annual Dinner—Hotel Statler. Report, Col. L. F. Grant, Chairman ECPD. Industry and Education by Horace Liversidge, Chairman of Board, Philadelphia Electric Company.

Reservation forms can be obtained from the Secretary ASEE, Northwestern University, Evanston, Illinois.

National Science Foundation to Support Travel of Scientists to International Meetings in 1954

The National Science Foundation will receive applications for a limited number of grants to assist in payment of travel expenses to six international scientific meetings in the mathematical, physical, and engineering sciences to be held during the latter half of 1954. The meetings of interest are:

International Union of Pure and Applied Physics, London, England, July 6–10, 1954. Applications should be received before December 1, 1953.

World Power Conference, Rio de Janeiro, Brazil, July 25-August 8, 1954. Applications should be received before December 1, 1953.

International Union of Theoretical and Applied Mechanics, Brussels, Belgium, July 28-August 2, 1954. Applications should be received before December 1, 1953.

International Mathematical Congress and International Mathematical Union, Amsterdam and The Hague, Netherlands, August 30-September 9, 1954. Applications should be received by January 1, 1954.

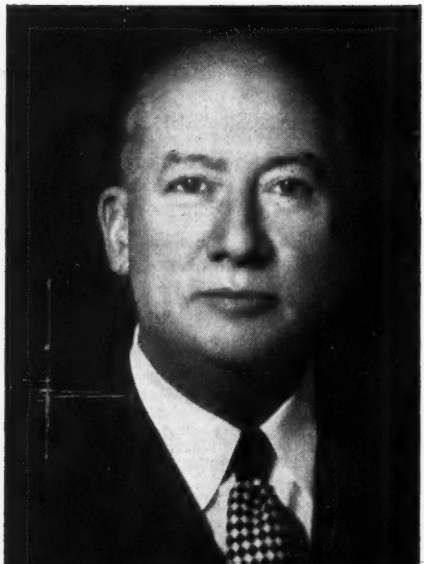
International Union of Geodesy and Geophysics, Rome, Italy, September, 1954. Applications should be received by January 1, 1954.

International Scientific Radio Union, Amsterdam, Netherlands, September, 1954. Applications should be received by January 1, 1954.

Applications are also being received for the following meeting to be held in 1953:

Pacific Science Congress, Quezon City, Philippines, November 16–28, 1953. Applications should be received before September 1, 1953.

Application forms may be obtained upon request from the National Science Foundation, Washington 25, D. C.



Citation to Dr. Rogers

To HARRY STANLEY ROGERS *for his achievements in bringing to engineering education a broad background of experience as an engineer, consultant, and administrator; for his inspirational leadership in the engineering profession and in engineering education; for his wise counsel and personal service to our Government during the war; for his devotion to civic enterprises and charitable organizations; for his leadership in professional society organizations, including his service as President of the Society for the Promotion of Engineering Education and Chairman of Engineers' Council for Professional Development; and for the high esteem in which he is held by his many colleagues, we present this 26th Lamme Award.*

Citation to Professor Obert

To EDWARD FREDRIC OBERT *for his inspired and vigorous teaching; for his sincere interest in his students as individuals; for his development of other good teachers; for his outstanding textbooks in the fields of thermodynamics and combustion engines; for his development of unique and effective methods of laboratory instruction; for his exceptional talent in guiding graduate students and directing research; and for his tireless search for better ways to present material in the classroom, we award this the 8th George Westinghouse Award.*

Lamme Award—1953—Harry Stanley Rogers

HARRY STANLEY ROGERS was born in Detroit, Michigan on August 7, 1890. His early education was obtained in the public schools of Detroit and of the suburb of Birmingham. His college training was pursued at the University of Wyoming from which he received the B.S. in civil engineering in 1914 and the Civil Engineering degree in 1926. He subsequently was awarded the honorary LL.D. by his alma mater in 1942, the Doctor of Science from Northeastern University in 1935, and the Doctor of Engineering from Rensselaer Polytechnic Institute in 1950.

Upon graduation from the University of Wyoming he served as instructor at the Universities of Iowa, Wyoming and Washington during which time he pursued graduate work at Iowa and Washington, and as assistant professor of Civil Engineering at Lafayette College. In 1919 he left education to become designing engineer with the Truscon Steel Company, but returned to the field of instruction in 1920 as professor of hydraulics and irrigation engineering at Oregon State College. In 1927 he was appointed Dean of Engineering and in 1928 the first Director of the Engineer-Experiment Station at Oregon State College. He served at Oregon State until the fall of 1933 when he accepted appointment as President of Polytechnic Institute of Brooklyn.

Throughout his college and teaching career he had an intermittent experience in irrigation, city and structural engineering including field and office practice and design. This experience prepared him for consulting in the field of water supply and sewerage which he did while in Oregon.

When appointed Dean at Oregon State he inaugurated and directed the development of a program of freshman engineering problems which was accompanied by a coordination of the work in engineering, physics and mathematics, and laid a foundation for the development of engineering ability as a way of thinking. As Director of the Engineering Experiment Station he initiated a sanitary survey of the Williamette Valley which laid the foundation for the regional correction of industrial wastes in the Williamette River Basin.

At Polytechnic Institute of Brooklyn he exercised leadership in the development of the program of undergraduate and graduate studies and of research and in a threefold expansion of the total student enrollment. Within this expansion the graduate school has been increased more than nine times. The current program in research has been developed from a very modest level to one involving three hundred people and the expenditure of more than two million dollars a year. He is currently Chairman of the Board of Polytechnic Research & Development Co., Inc., a company manufacturing microwave measuring equipment which is owned by Polytechnic Institute.

Throughout the years President Rogers has been active in the work of the American Society for Engineering Education, serving several terms on the Council, one term as Vice President, and two terms as President as well as on numerous committees. In 1932 he persuaded the Council to accept the invitation of Oregon State College to hold the 32nd annual convention on the Pacific Coast for the first time, and promoted the development of the Pacific Northwest and Pacific Southwest Sections which were brought into the Society at that convention. As President of the Society in 1945 he was chairman of the committee to write the new constitu-

tion under which the Society for the Promotion of Engineering Education and the Engineering College Research Association were united in the American Society for Engineering Education.

He likewise has been active in the Engineers' Council for Professional Development throughout its entire history, having been a member of the original Engineering Education Committee, a member of the Professional Training Committee, for nine years a member of the Council and for three years its Chairman. During his administration as Chairman, the work of the Selection and Guidance Committee was expanded to a nation-wide service and the pilot program of training in the first five years after college was inaugurated at the University of Cincinnati.

President Rogers has had wide interest in student affairs and activities. He served upon the athletic committees in three institutions and for a number of years was Chairman of the Board of Athletic Control and a member of the Pacific Coast Conference while at Oregon State College. He has been a national officer of his own fraternity and served a term as President of the National Interfraternity Council.

He has been widely and prominently identified with educational, civic and business interests. He has served as Vice Chairman of the Board of the Long Island College of Medicine, as a member of the Board of Higher Education of the City of New York, a member of the Board of the Associated Colleges of Upper New York and a member of the Board of Visitors of the Air University, United States Air Force. He has been President of the Brooklyn Chamber of Commerce, the Rotary Club and the Downtown Brooklyn Association. He has been chairman of drives for charitable and civic purposes, including the United Hospital Fund, the Red Cross and the World War Fund. In 1946 he was presented the Gold Medal of the Downtown Brooklyn Association for most distinguished service to Brooklyn. He is a Director of the Intertype Corporation, Namm-Loeser's Inc. and the New York Telephone Company, a Trustee of the Brooklyn Savings Bank and the Brooklyn Hospital, and Chairman of the Advisory Board of the Chemical Bank & Trust Company of Brooklyn.

In addition to his many other duties, Dr. Rogers found time to serve his government in the Office of Production Management as Chairman of the General Products Division of Priorities and as First Chief of the Rubber, Cork and Synthetic Rubber Branch. He left the services of the OPM in October 1941 but was called back to its successor the War Production Board in the spring of 1942 as Chief of the Rubber and Rubber Products Branch where he headed the control of natural rubber until October 1943. In 1943 he served as a member of the Truck Committee of the combined Raw Materials and Resources Board. He was a member of the National Engineers Committee which wrote reports for the State and War Departments on the industrial disarmament of Germany and Japan. For this last service he received the President's Certificate of Merit.

He is a member of Phi Kappa Phi, Tau Beta Pi, Sigma Tau, Sigma Xi, Pi Tau Sigma. His professional societies include the American Society of Civil Engineers, the American Institute of Consulting Engineers and the American Society of Mechanical Engineers.

George Westinghouse Award—1953—
Edward F. Obert

EDWARD FREDRIC OBERT was born in Detroit in 1910, and was educated in the Chicago Public Schools. His education at Northwestern University and the University of Michigan was interrupted several times because of the depression in the '30's. After two years in college, he was employed at the Western Electric Company in Chicago as an Engineer of Manufacture (1929, 1930). He returned to school and received the Bachelor of Science degree in 1933, and the degree of Mechanical Engineer in 1934, from Northwestern University. He then became an engineer in the office of the Inspector of Naval Materials (Chicago, 1934–1937), stationed at the Buda Company in Harvey, Illinois. His primary duties were the inspection and testing of diesel and gasoline engines, and all of the components in the laboratories of over 100 midwest suppliers of naval equipment. He received the degree of Master of Science from the University of Michigan in 1940.

Professor Obert joined Northwestern as an instructor in 1937, became an assistant professor in 1940, an associate professor in 1943, and a professor in 1950. While an instructor, the Walter P. Murphy gift of several millions of dollars to Northwestern University made possible the establishment of a large Technological Institute to replace the heretofore small engineering college. Because of the small size of the existing faculty, it was necessary for Professor Obert, though only an instructor at the time, to do much of the design of the Heat Power Laboratory. He was entirely responsible for the design and equipment of the Combustion Engine Laboratory and supervised the building construction and installation of equipment for all the heat power laboratories and designed many of the components. He has been director of all the Heat Power Laboratories since their inception and his plan of instruction is unique in several respects (the plan was described to the Society at the Annual Meeting in 1948). Professor Obert has had a tremendous influence on the lives of his students, many of whom decided on a teaching career. A professor at Penn State says, "His classroom, like his personality, was lively and stimulating. No stodgy droner from stale notes, every subject was made interesting and a challenge." A professor at M.I.T. writes, "During my eight years as a teacher in mechanical engineering, I have continually, consciously set for myself the task of attempting to maintain as sincere an interest in my students as Professor Obert had in us as students. My Association with him has had a great influence on my teaching."

Professor Obert's many interests are reflected in his writings. His books, which have been widely adopted and are well known to all teachers of mechanical engineering, include, "Internal Combustion Engines," "Thermodynamics," and "Elements of Thermodynamics and Heat Transfer." He has done research and published papers in the fields of thermodynamics, combustion engines, and machine design. He is an engineering consultant, and a registered professional engineer, with most of his work in the power field.

Professor Obert's extracurricular activities include being faculty advisor to the Society of Automotive Engineers since 1943; to the Triangle Fraternity since 1938; and, formerly, to the ASME stu-

dent branch (1937–1943). He is now serving on the ASEE committee for Ethical Standards, on the committee for Visual Aids, and is Illinois-Indiana representative to the Council. His society memberships are in ASME, SAE, Sigma Xi, Tau Beta Pi, Pi Tau Sigma, Triangle fraternity, and the Mark Twain Society. This year he was elected Chicago Section Chairman of the ASME.

College Notes

A grant of $150.00 to the **University of Pittsburgh** from the trustees of the **Westinghouse Educational Foundation** to continue for five years its present graduate professorship in the School of Engineering and to provide an additional five-year professorship in engineering has been announced.

* * *

Dean William H. Hall of the **Duke University** College of Engineering has resigned, and Walter J. Seeley, Chairman of the Electrical Engineering Department, has been named Dean. A member of the faculty for 38 years, Hall has been dean of the college since it was established in 1939 and director of the University's engineering training program since 1937. He will retire late next year. Professor Seeley has been chairman of the Department of Electrical Engineering since 1935 and a member of the faculty since 1925.

* * *

Bro. Jerome Parr, S.M., Associate Professor and Head of the Department of Mechanical Engineering, has been appointed Dean of the College of Engineering at the **University of Dayton** succeeding Bro. J. Albert Wehrle. Bro. William Bellmer, S.M., Head of the Department and Professor of Mathematics, has been appointed Associate Dean of Science.

* * *

Howard University dedicated its new School of Engineering and Architecture Building as part of a two-day conference held on May 8–9, 1953, which included the dedication ceremonies, a conference on "Improving the Teaching of Engineering and Architecture," a dinner in honor of visiting delegates and representatives and the annual meeting of the National Capital Area Section, ASEE. Dean N. W. Dougherty, University of Tennessee, delivered the Dedicatory Address.

* * *

One of the nation's top authorities on metals research has been appointed as Dean of Graduate Studies at **Carnegie Institute of Technology.** Dr. Robert F. Mehl, Head of the Metallurgical Engineering Department and Director of the Metals Research Laboratory at Carnegie, will immediately assume his new appointment as Dean of Graduate Studies in addition to his present positions.

* * *

A gift of $1,200,000 from the Phillips Foundation of New York for a new electrical engineering center at **Cornell University** has been announced. The building will house Cornell's School of Electrical Engineering, the oldest such school among American colleges and universities. Construction is expected to begin this year.

* * *

Dr. Webster A. Jones, Dean of the College of Engineering and Science at **Carnegie Institute of Technology,** has been appointed Vice-President in charge of industrial and government relations at Carnegie.

Report of the Secretary
1952-53

Each year in the Society's operation, the changing pattern of events brings forth new and interesting problems of vital importance to engineering education. The continuing projects, dealing with the familiar themes of Evaluation of Engineering Education, Teaching Aids, Improvement of Teaching, Cooperation Between Engineering Colleges and Secondary Schools, and Engineering Manpower, are all current centers of energetic Society activity. In addition to these, there arise new problems, such as those associated with the threat of unionization of the engineering profession, the proper infusion of concepts of ethics and professional precepts into our programs of engineering education, the necessity of recognizing and providing adequate incentives for good teaching to counteract the growing diversionary emphasis upon research, the preparation of a Manual of Graduate Study, the paper contest for young teachers, and the fuller integration of young teachers into Society activities.

It is difficult to draw general trends from such widely diversified activities but there seem to be several predominant areas of common interest. One of these is the attempt to appraise the directions of movement of the rapidly advancing frontiers of scientific and technological knowledge. There seems to be universal agreement that science and technology are undergoing evolutionary change at probably a more rapid rate than ever before and also that science is now exploring new areas which will be translated into significant engineering developments in the years ahead. But there is very little agreement as to what, if anything, should be done about the engineering curricula to meet this challenge.

A second element of broad general interest is the attempt to clarify the significance and thought processes involved in creative thinking as contrasted to analytical thinking. There seems to be general acceptance of the idea that the two thought processes are different and that instructional methods which develop analytical ability do not in general develop creative ability. There is also general acceptance of the fact that very little of our current engineering instruction is directed at developing creative ability, despite the fact that this is a primary function of engineering.

It is in problems such as these that the Society's function as a national forum, bringing together divergent views and subjecting them to critical analysis, can help to achieve clearer definitions and lead to logical, orderly solutions.

During the year, the Officers of the Society have devoted a great deal of time and personal service to organizing and developing the projects of the Society. President Woolrich has brought to the attention of the General Council and Executive Board numerous problems which have become major Society projects. Mr. Boring took an active lead in organizing the Young Engineering Teachers' Paper Contest and in assisting ASEE Sections in their problems. The contributions of Deans White, Lampe, and Walker are mentioned below in connection with the work of the Divisions, Committees, and Councils of the Society.

Unionization of the Engineering Profession

The vigorous efforts of labor unions to embrace the entire engineering profession presents a serious threat to the profession

which cannot be ignored. By preying upon elements of dissatisfaction and resentment in certain companies, the unions have succeeded in engulfing the entire engineering staffs.

President Woolrich has brought this growing situation to the attention of both the ASEE membership and the national engineering societies. His article "The Professional Engineer—Ascending to New Heights or Leveling Off to Mediocrity?" was published in the April issue of the JOURNAL, as well as in the *Journal of the National Society of Professional Engineers*, and reprints were distributed to the entire membership of the Engineering Manpower Commission. This article emphasized the dangers inherent in the "leveling off" influences of unionization and the fact that this can be a serious deterrent to engineering progress. He also stressed the obligation of companies to adopt a progressive policy of analyzing the causes of resentment and dissatisfaction among engineering employees and to take positive steps to remedy these situations.

This is a problem which affects every member of the profession and one which cannot be allowed to grow by default.

Instructional Manpower

President Woolrich has called attention to the fact that many engineering colleges are suffering from a shortage of competent faculty members. The inelastic budgets of colleges and the attractive offers which industry is making to faculty members are exacting a heavy toll of the engineering faculties. This situation will become increasingly serious over the next few years because of the sharp decline in graduates available to industry.

This is a major problem of both industry and the colleges, since it will influence the quality of engineering graduates in the future. President Woolrich has suggested that top-level conferences be arranged between the university administrations and companies to find a solution to this growing problem.

Graduate Students—Where Will They Come From?

The ever-rising ROTC quotas (from 40% to 60% of the enrolled engineering students) will present a serious problem over the next few years at the graduate level. Very few of the ROTC students will return to college for graduate study. The attractive job offers which industry is making to the balance of the graduates will further deplete the graduate ranks. It seems evident that graduate enrollments are destined to slump sharply over the next few years. What effect will this have upon the advancement of science and technology of the future?

Evaluation of Engineering Education

The ASEE Committee on Evaluation of Engineering Education has held four Committee meetings during the past year. This Commitee is undertaking a thoroughgoing investigation of engineering education and is endeavoring to interpret the rapidly changing movements of science and technology in terms of educational improvements. It will attempt to identify areas where significant improvement might be achieved and make recommendations for further studies in these fields. This Committee, under the Chairmanship of Dean L. E. Grinter, is working with numerous Sub-Committees in engineering colleges throughout the country. It is also working cooperatively with the ECPD Committee on Engineering Schools in those phases dealing with the minimum levels of education acceptable for accreditation purposes. This project is jointly sponsored by the Engineers Council for Professional Development, the Engineering Foundation, and the ASEE. A total of $6000 has been received from ECPD and the Engineering Foundation and a like amount has been pledged for next year.

European and Pan-American Conferences on Engineering Education

Considerable interest in engineering education has been expressed throughout

Europe and South America. A conference on engineering education known as ESEC was held during the week of January 12, 1953 in London. This was attended by representatives from the United States, Great Britain, Belgium, Denmark, France, Germany, Holland Italy Norway, Sweden and Switzerland. President Woolrich represented the ASEE at this conference. Dean Saville and Col. L. F. Grant represented the ECPD.

Another Conference on engineering education was the UPADI Conference of Pan-American Countries which this year held a meeting in Louisiana attended by Deans Lasalle and Steinberg.

ECAC Activities

Dean J. H. Lampe, Vice-President in Charge of ECAC, reports on many ECAC projects of importance to engineering education, among which are the following:

The ECAC Commitee on Engineering Manpower, under the Chairmanship of D. S. Bridgman, has drawn up an analysis of the current engineering manpower situation.

The ECAC Committee on Secondary Schools has been actively working with the AAAS, the National Science Teachers' Association, and several national mathematics societies in an effort to develop a nationwide program directed at improving the quality of instruction of mathematics and science in the secondary schools.

The Selection and Guidance Committee of ECAC under the Chairmanship of Dean N. W. Dougherty has worked with the Educational Testing Service during the past year in developing proficiency examinations at the senior college level for engineering students. These examinations will be completed and available from ETS in the near future for use by engineering colleges.

The Committee on International Relations of the ASEE has endeavored to expand its activities for International Guests.

A new Committee was appointed by ECAC during the past year to provide advice and assistance to the government's Mutual Security Agency and Technical Cooperation Administration in matters relating to technological education. This constructive relationship was requested by MSA–TCA as a result of a conference arranged by ECAC last fall. The Advisory Committee is under the Chairmanship of Dr. Ralph Morgan of the National Science Foundation.

ECRC Activities

The ECRC, under the Chairmanship of Vice-President Eric Walker, is completing a Directory of Current Research, which lists Research projects in progress in engineering colleges throughout the Country. This publication will prove of considerable value to college administrative officials, research personnel, government officials, and industrial people interested in research.

An active Committee of the ECRC, under the Chairmanship of Dr. Ray Woodrow, has rendered valuable service to Deans of Engineering Colleges and Directors of Research in keeping them informed of the current policies and practices of the government relating to research contracts.

Other Activities of ECRC are reported in the Vice-President's report.

Graduate Teaching Manual

The Graduate Division of the Society his just completed publication of a "Manual of Graduate Study in Engineering." This Manual is a thorough treatment of the objectives and organizational problems in graduate study, including faculty problems, admission and degree requirements, research requirements, language requirements, examinations, and other pertinent problems of graduate study. This manual was prepared by a distinguished group of faculty members all of whom have had extensive and varied experience in graduate teaching, research, and administration. The Committee was under the Chairmanship of Dr. Grinter.

Committee on Ethics

A number of professional engineers have expressed serious concern over the decline of ethical standards in engineering practice, particularly in the consulting and construction fields. There have been numerous requests that the colleges make a critical review of their methods of acquainting students with ethical precepts and the basic concepts of the engineering profession. A Committee under the Chairmanship of Dean C. J. Freund was appointed during the past year to study this problem. The Committee has made an extensive survey of opinion of engineers in industry, professional engineers, and teachers to get their views in this matter. A progress report will be presented at the Annual Meeting at Gainesville. It is expected that this project will continue for at last another year.

Teaching Aids Project

The project of reviewing and evaluating teaching aids in the fields of civil engineering, chemical enginering, mechanical engineering, mechanics and mathematics will be concluded by the summer of 1953. A bulletin listing the teaching aids which are considered by the reviewing committees to be of acceptable quality for engineering instruction will be published. The bulletins will be sold to the engineering colleges at cost price.

Improvement of Teaching

The Report of the Committee on Improvement of Teaching is in continued demand, as evidenced by the fact that over 10,000 copies have been requested by engineering colleges throughout the country. The response which this report has received is tangible evidence of its significant contribution to the improvement of engineering education.

Recognition and Incentives for Good Teaching

The growing emphasis upon research in engineering colleges is tending to shift the interest and efforts of faculty members away from engineering instruction toward research. This may cause a significant impairment of engineering instruction unless counteracting influences are brought to bear. In order to study this problem and recommend procedures for focussing attention upon high quality teaching, a Committee on Recognition and Incentives for Good Teaching was appointed during the past year.

Paper Contest for Young Engineering Teachers

The paper contest for Young Engineering Teachers, which was initiated during the past year, was received with considerable enthusiasm by the younger faculty members and has provided a wholesome stimulation of interest in Society participation on the part of these members. This experience has shown that the younger faculty members are eager to take part in Society functions, as well as to broaden their interests and develop their professional statures. It is estimated that over 75 papers were submitted.

Integration of Young Faculty Members into ASEE Activities

The Society has taken distinct steps to enlarge the participation of younger faculty members in ASEE activities. Many of the Sections of the Society have encouraged young faculty members to organize their own activities in conjunction with the Section meetings. This plan has proven exceedingly popular with the younger faculty members and has resulted in imaginative and well-planned programs. During the past year the Society has successfully expanded its membership among the younger faculty members by directing its membership campaign to faculty members in the lower academic ranks.

Participation of the younger faculty members in Society activities will enable them to broaden and enrich their outlook on engineering education and the engineering profession. It will bring to the Society more of that element of vigorous,

unorthodox thinking which is characteristic of young people and which is so vital to progress.

ECAC Conferences on ROTC Programs

The proposals of the Army and Air Force ROTC administrations to modify their programs in the general direction of eliminating the technical courses and introducing a more general type of ROTC program have been the cause of considerable concern on the part of administrative officers in engineering colleges. The principal objection to the new ROTC proposal is that the substitution of a general program for the technical courses may result in an educational program of a superficial character which would detract from both the interest and educational value of the program insofar as engineering students are concerned. Also, the substitution of general courses for a technical program might cause indiscriminate classification and assignment of engineering students after they graduate, so that technically trained ROTC graduates would be more likely to get service assignments outside of their professional field of specialization.

A series of conferences was arranged by Dean J. H. Lampe, Vice-President of ASEE in charge of ECAC, with officials of the Army and Air Force ROTC Administrations and also with the American Council on Education. This resulted in the clarification of the Air Force policy and a statement by the Army that for the present, the "Branch General" system would not be compulsory, but that technical units would be retained in schools which so desire.

Engineers' Joint Council

During the past year, the Society became a participating member in the Engineers Joint Council under action taken by the General Council of the ASEE in June 1952. Dean Thorndike Saville, the ASEE representative, was elected Vice-President of EJC. The Engineers' Joint Council currently has active committees in the fields of: Engineering Manpower, Increased Unity of the Profession, Constitution and By Laws, International Relations, Special Surveys, National Water Policy, Engineering Sciences, Labor Legislation, and Atomic Energy Legislation.

Teaching Position Advertisements in Journal

During the past year, a plan of advertising teaching positions in the JOURNAL OF ENGINEERING EDUCATION was inaugurated. This service has proven exceedingly helpful to the colleges in finding personnel.

Fall Meetings of ECAC and ECRC

The Fall Meetings of the ECAC and ECRC were held in conjunction with the Centennial of Engineering in Chicago. The conference program, attended by over 300 educators, featured papers on "The Modern Engineer Should Be Trained as a Scientist" and "What Are the Contemporary Demands on Engineering Curricula?" This was a joint meeting with the Engineers' Council for Professional Development.

The Executive Board has suggested that the Divisions and Committees of the Society consider utilizing these Fall meetings for the purpose of holding executive committee meetings to formulate their plans for the year's activities. This would provide a common meeting ground for the Council members and officers of Divisions and Committees throughout the Society. The ECRC–ECAC program would be open to the Society membership and would be developed along lines which would be of interest to all of those in attendance. This year, the Fall meetings will be held on October 15 at the Statler Hotel in New York.

Associate Institutional Membership

The Committee on Associate Institutional Membership, under the Chairmanship of Jesse McKeon, has carefully organized the program for soliciting Associate Institutional Memberships in the

Society. The Committee contains leading administrators in companies throughout the United States. They will direct invitational letters to responsible individuals in other companies. To date, this Committee has obtained 35 new Associate Institutional members. It is expected that the program will result in a substantial expansion of Associate Institutional Memberships in the Fall of 1953.

Summer Schools

Two summer schools have been authorized this year. The Industrial Engineering Division has planned a Summer School on the theme: "Quantitative Measures in Industrial Engineering Courses." The Educational Methods Division and the General Electric Company have pooled forces to conduct a Summer School which presents some of the material of the G. E. Company Advanced Engineering program to a select group of young teachers. A similar summer school, conducted last year, received high commendation from all those who attended.

Division Publications and Activities

Behind the scenes of ASEE activities, we often find people who are working quietly, effectively, and conscientiously—not for the glory, but rather to perform an important service. The various Division publications which are all self-financing and which bring to the Division membership new concepts of curricular material and teaching methods are examples of such service. Here are the editors who have done an excellent job this year: Professor M. B. Scott, Civil Engineering Bulletin; Professor T. T. Aakhus, Journal of Engineering Drawing; Professor Glenn Murphy, Bulletin of the Mechanics Division; Professor L. F. Kreisle, Machine Design and Manufacturing; Professor A. H. Cooper, Transactions of the Chemical Engineering Division; Professor Karl P. Hanson, Heat Power News and Views.

Atomic Energy Education

The Atomic Energy Committee, under the Chairmanship of Dr. H. H. Armsby, held one meeting at the Argonne National Laboratory, a considerable portion of which was devoted to a discussion, with the authors of the new "Sourcebook on Nuclear Engineering," of many matters of policy and of detail in connection with the preparation of this sourcebook. It is hoped that the book will be ready for use by the summer of 1954.

Committee on Society Function

This Committee is exploring ways to modify Society organization and improve the procedures in order to improve its functioning. An organizational Committee meeting was held in November and the work has been delegated initially to project teams.

Journal of Engineering Education

Two issues of the JOURNAL this year were devoted to papers presented at the Fall Meetings of the Society in conjunction with the Contennial of Engineering. These issues have received high commendation from many sources.

An article by President Eisenhower in the November issue scooped the press and presented views on technological manpower.

Division Activities

The following are some of the activities of the ASEE Divisions, under the direction of Vice-President W. C. White.

The Aeronautical Engineering Division held a mid-winter meeting in New York in January to prepare plans for joint meetings between its Division and the Institute of Aeronautical Sciences.

The Civil Engineering Division completed a report on Sanitary engineering. A joint Committee of ASEE and ASCE on Sanitary engineering was appointed. Considerable attention has been given to curricular development in Soil Mechanics, Construction, Transportation and Research. The Division publishes a Civil Engineering Bulletin three times a year.

The Mechanical Engineering Division continued publication of its bulletins

"Machine Design and Manufacturing" and "Heat Power News and Views."

The Mathematics Division has been actively working with the ECAC Committee on Secondary Schools and other societies in an effort to develop a nationwide approach to the improvement of mathematics instruction in the Secondary Schools.

Educational Methods Division has developed a continuing program on Improvement of Teaching in cooperation with sub-committees in engineering colleges and is evaluating the reports received by last year's Committee. The Division also has active sub-committees on Learning Aids, Inservice Training, Training of Teachers, Educational Research, Subject Matter, and Bibliography of Teaching.

The Engineering Drawing Division held its mid-year meeting at the University of Nebraska. This Division has taken an active role in helping ASA establish national and international standards.

Engineering Mechanics Division has published its Bulletin of Engineering Mechanics, and is emphasizing in its programs teaching techniques and scope of course content at both undergraduate and graduate levels.

Activities of the Relations with Industry Division this year were centered around its 5th annual College-Industry Conference in January, with papers on utilization of engineering talent, continued education of the engineer, education of talented students, and other interesting subjects.

Our active Technical Institutes Division has had committees working industriously on: Completion Credentials, Cooperation with Office of National Defense, Student Selection and Guidance, Curriculum Development, Teacher Training, Technical Institute Studies, Relations with Industry, Technical Institute Manpower Studies, and Relations with Professional Societies. A continuing feature of this Division is its Annual James McGraw Award for distinguished contributions to Technical Institute Education.

The Humanistic-Social Division has prepared a proceedings of its two Summer Schools. Also, jointly with the English Division, it has conducted a survey of liberal studies in the engineering curricula throughout the country.

The Engineering Economy Division has a Sub-Committee working on Aims and Objectives of Engineering Economy.

Much of the work of the Division of Young Engineering Teachers has been at the local level in promoting Section activities for young teachers and in encouraging entries in the Y.E.T. paper contest. Also six groups have been working in compiling information from the reports of the Committee on Improvement of Teaching in cooperation with the Educational Methods Division.

The Physics Division has collaborated with the Atomic Energy Committee in arranging programs dealing with atomic energy education.

The Manual of Graduate Study mentioned previously is a distinctive contribution of the Graduate Division.

Electrical Engineering is holding a series of conferences, attempting to clarify the fundamental concepts.

The Evening Engineering Education Division is currently struggling with problems of graduate school traditions and the restrictions which they impose.

The Cooperative Engineering Division held a Mid-Winter Workshop at Fenn College dealing with Cooperative Education Problems in Industry. The Division held meetings in Washington to clarify and correct discriminations in the PL. 550 Act.

The Architectural Engineering Division published two issues of the Architectural Bulletin for distribution to its members.

Chemical Engineering has emphasized instrumentation and also originality and other new tools in engineering education.

Formation of Japanese Society for Engineering Education

A consequence of the ASEE Mission on Engineering Education to Japan in the

summer of 1951 was the expression of a desire on the part of Japanese educators to organize a similar society. The Japanese Society for Engineering Education has been officially inaugurated and held its first Annual Meeting in July, 1953.

Annual Meeting

Several new innovations were introduced in the Annual Meeting this year. A business General Session was inaugurated on Monday afternoon for the purpose of acquainting the Society membership with some of the principal current Society projects and providing them with an opportunity to express their views on these projects.

The multiplicity of programs of the various Divisions and Committees of the Society is placing a severe strain on the schedule because of the number of conflicts. Perhaps a simpler system might be worked out in the future.

Society Operations

The Society has doubled its membership in the past six years. Its activities have grown rapidly in many diverse directions. This growth, although highly commendable, has placed a severe load upon the headquarters staff. Last year the Executive Board authorized appointments of a part-time Assistant Secretary and an additional half-time office secretary. This has provided partial relief, but it seems inevitable that if Society operations are to continue to grow, a further increase in staff will be needed.

There is no way in which a Society such as ASEE can avoid the inevitable inflation in costs, particularly when the Society operations are expanding. The cost of publishing the JOURNAL OF ENGINEERING EDUCATION alone has increased from about $8,000 before the war to the current figure of $26,000. This Soicety has a dues structure about one-third that of other national engineering societies and it operates with a very minimum overhead. Every operation which can possibly be streamlined has been the subject of careful scrutiny. The Society avoids extensive collateral services to its individual members and focuses its primary efforts upon the projects of greatest importance to the improvement of engineering education and to maintaining a close working liaison between its Councils, Divisions, Committees and Sections.

Respectfully submitted,
ARTHUR BRONWELL, *Secretary*

In the News

A program of international cooperation in education to assist in rehabilitation of the **University of the Philippines** has been undertaken by Stanford University. A $500,000 contract extending two and a half years has been signed by President Vidal A. Tan of the University of the Philippines and by Lloyd W. Dinkelspiel, president of the Stanford University Board of Trustees. The program is sponsored and financed by the U. S. Mutual Security Agency. Under terms of the contract, Stanford will send to Manila annually eight faculty specialists for a year each and three administrative consultants for shorter periods. They will be appointed from various other universities as well as Stanford. The University of the Philippines will provide 555,000 pesos ($277,500) for expenses of the educators and their families in Manila. Their task will be to assist the Colleges of Engineering, Education, and Business Administration of the Philippine national institution. This assistance will consist primarily of developing curriculums and teaching methods, including actual teaching in classes and faculty seminars.

Personnel of the Stanford project will also assist in selection of books, equipment, and supplies.

Minutes of Executive Board Meeting

A meeting of the Executive Board of the American Society for Engineering Education was held on Sunday evening, June 21, at the Primrose Grill, Gainesville, Florida. Those present were: W. R. Woolrich, *President;* M. M. Boring, J. H. Lampe, E. A. Walker, W. C. White, *Vice Presidents;* C. L. Skelley, *Treasurer;* A. B. Bronwell, *Secretary;* C. E. Watson, *Assistant Secretary,* and M. Merrill.

Secretary's Report

Secretary Bronwell reported as follows:

1. That preliminary plans for the joint meeting of ASEE and ECPD in New York, October 15–17 were formulated at a meeting of ECPD at which he was present.

2. There will be meetings of the ASEE Executive Board and General Council at the time of the Fall Meetings.

3. The Divisions and Committees of the Society will be encouraged to hold meetings at this time and rooms will be provided for such meetings.

4. The ASEE has received a total of $6,000 in contributions from the Engineering Foundation and the constituent societies of ECPD to finance the project "Evaluation of Engineering Education." Indications at present are that a similar amount will be forthcoming next year.

Treasurer's Report

The Annual Audit as of May 15 and projected estimated Audit as of June 30 were presented by the Treasurer. The net operations for the year indicated a deficit of $1,687.72 for the year.

Vice President White suggested that some of the Society money carried in cash might be invested. The Board recommended that the Committee on Financial Policy, under the Chairmanship of Dean F. M. Dawson, study this situation and make recommendations for the possible investment of $15,000 of Society funds.

The Board voted to accept the tentative Audit.

Suggested Budget for 1953–54

The Secretary presented a suggested budget for 1953–54. This provided for an increase in advertising income, which will result from a substantial increase in advertising rates, as well as an estimated increase in income due to new Associate Institutional members.

Other items of expense were comparable to those of the past year. The Secretary pointed out that the budget was extremely close. He stated that there is currently no provision for either insurance benefits or social security for the office secretarial staff. While both Assistant Secretary Watson and he have benefits as employees of Northwestern University, this matter is of consequence to the secretarial help. He recommended that a study be made with a view toward establishing some equitable plan for insurance benefits, and social security. He also stated that the office staff had been seriously overloaded during the past year, owing to a significant growth in Society activities, and that the proposed budget did not provide for any substantial increase in secretarial help in order to relieve this situation.

Treasurer Skelley stated that there were indications of further increases in printing costs and if this were to occur, the budget expense item would not be adequate to maintain the JOURNAL at its present volume. Professor Watson urged that the publication budget be increased, rather than reduced. He stated that it had been necessary to reject a number of papers which could have been published during the past year had the budget been sufficient. The June issue of the JOURNAL was cut drastically in order to minimize the budgetary deficit in printing costs.

The Board considered other means of increasing Society income. It was pointed out that the Associate Institutional Membership Drive would probably yield increased income in the future, but it was questionable that this would provide sufficient additional revenue to pay for rising costs of publication

and probable rising costs owing to the need for additional help in the ASEE Headquarters Office.

The Secretary pointed out that the Society could not expect any substantial increase in working funds as a result of expansion of individual membership, since the cost of servicing the membership practically equals the income from dues.

In view of the probable increase of cost of publications, the Board voted to recommend to the Council that the budgeted item of cost of publications be increased from $27,000 to $30,000 and that there be added to administrative salaries $600 to allow for part-time help during the current year.

The above appropriations would result in a budget deficit of approximately $3,600 during the current year. The executive Board requested that the Committee on Financial Policy study this matter and present recommendations to the General Council.

Report of Vice Presidents

Vice President White reported on activities of Divisions and Committees.

He also presented the two resolutions passed by the Committee on Evaluation of Engineering Education. The Board discussed these resolutions and referred them to the Council. It was recommended that no action be taken at this Annual Meeting, since this was a matter of considerable importance which should be widely discussed before action is taken.

Vice President Boring reported on the exceptional success of the YET Paper Contest. He stated that over 70 entries had been received by Sections throughout the country. He stated that many of the Sections have provided activities for the younger members in order to encourage their participation.

Vice President Lampe summarized activities of the ECAC, including:

1. The appointment of an Advisory Committee to consult with the Mutual Security Agency and Technical Cooperation Administration in matters relating to foreign aid programs of engineering education.

2. The activity of the Committee on Secondary Schools, which is working with other organizations in formulating a nation-wide program for better integration of Secondary School and college instruction.

3. The Selection and Guidance Committee has been working with the Educational Testing Service in developing a new series of tests at the graduate level.

4. The ECAC is giving consideration to problems of enginering colleges in attracting and holding younger faculty members.

Vice President Walker reported that the ECRC has completed publication of the Review of Current Research. This is a comprehensive tabulation of research projects in colleges throughout the country. It will be exceedingly helpful to industry and government in identifying colleges where there is competent faculty personnel in specific fields of research.

Evaluation of Engineering Education

This is reported in the meetings of the General Council.

The Executive Board approved a contract appropriation of $5,800 for the current year for a part-time secretary, the funds to be taken from contributions from ECPD and the Engineering Foundation. The Executive Board also voted to send resolutions expressing appreciation of the ASEE to the Engineering Foundation and to the constituent societies of ECPD for their financial support of the Evaluation of Engineering Education project.

Teacher Shortage

President Woolrich emphasized the serious shortage of engineering teachers, which is developing as a consequence of limited budgets in engineering colleges and attractive opportunities offered by industry to the younger faculty members. This matter was referred to the General Council for action.

Joint Sponsorship of Technical Conferences by ASEE and Other Major Engineering Societies

The Secretary presented a proposal for the establishment of a procedure in ASEE for encouraging the Divisions of ASEE to hold Conferences jointly with other major engineering societies. The objective is to identify those areas in which science and technology are moving rapidly ahead. Conferences would then be arranged in these specific areas, with leading authorities on the program to explore the subject thoroughly and identify fundamental concepts. The purpose would be to determine how the fundamental concepts can best be fitted into the engineering curriculum.

The Board suggested that the matter be given thorough consideration and recommended that it be presented to the General Council for discussion.

Branch of ASEE at the University of Illinois

A petition by the University of Illinois to establish a Branch of ASEE at Navy Pier was approved.

UNESCO Annual Meeting—University of Minnesota

The UNESCO Annual Meeting will be held on September 15–17 at the University of Minnesota. It was recommended that Mr. Wendell Burton and Professor R. C. Jordan be appointed as ASEE representatives.

Location of 1956 Annual Meeting

After consideration of outstanding invitations, the Executive Board decided to hold the 1956 Annual Meeting at the University of Toronto. The 1954 Annual Meeting will be at the University of Illinois and 1955 will be at the Pennsylvania State College.

* * * * * *

A meeting of the old and new members of the Executive Board of the American Society for Engineering Education was held on Wednesday, June 24, at 6:30 P.M. in the Oak Room, Florida Union, University of Florida, Gainesville, Florida. Those present were: W. R. Woolrich, *President;* L. E. Grinter, *President-elect;* M. M. Boring, W. C. White, J. H. Lampe, E. A. Walker, *Vice Presidents;* B. R. Teare, Jr., W. L. Everitt, *Vice Presidents-elect;* C. L. Skelley, *Treasurer;* G. W. Farnham, *Treasurer-elect;* A. B. Bronwell, *Secretary;* C. E. Watson, *Assistant Treasurer;* F. M. Dawson, and M. Merrill.

Financial Policy of the Society

Dean Dawson, Chairman of the ASEE Committee on Financial Policy, reported that the financial trends over the past 8 years were as follows:

A. The income from dues has increased from $18,600 to $49,000.
B. Advertising income increased from $3,800 to $13,400.
C. Total income has increased from $23,960 to $67,200.
D. The largest single increase in expense is the cost of the publications, which is increased from $9,600 to $26,500. The size of the JOURNAL has not changed over this period.
E. The expansion of Society membership and activities has necessitated adding an Assistant Secretary and also additional secretarial help in the headquarters office.

He discussed various possible dues structures and stated that a change in dues status would necessitate a letter ballot to the individual membership. Inasmuch as the Committee on Society Functions probably will not have any constitutional changes to propose for the next 6 months, he suggested that the matter relating to dues might be submitted to the Society membership independent of constitutional amendments.

A motion that the Executive Board recommend to the General Council a dues status of $6.00 for members under 35 years of age and $10 for members over this age was voted.

Applications for Associate and Affiliate Institutional Members

The following applications for Associate Institutional Membership were approved:

Columbia-Southern Chemical Corporation, Pittsburgh 22, Pennsylvania
Consumers Power Company, Jackson, Michigan
General Radio Company, Cambridge 39, Massachusetts
Lockheed Aircraft Corporation, Georgia Division, Marietta, Georgia
Louisiana Power & Light Company, New Orleans, Louisiana
Sprague Electric Company, North Adams, Massachusetts
Wisconsin Power & Light Company, Madison, Wisconsin
California Research Corporation
Lukens Steel Company
Socony Vacuum Oil Company
Florida Power Company
Boeing Airplane Company
Armour & Company
International Harvester
Deere Company
C.B.S.—Hytron Division
Toledo Edison Company

Request of Aeronautical Division

The Secretary stated that the Aeronautical Engineering Division had requested permis-

sion to hold a mid-winter meeting jointly with the Institute of Aeronautical Sciences. They would like to have ASEE underwrite a portion of the expense of the meeting. The discussion centered around the methods of financing mid-winter meetings of other Divisions and it was brought out that these are self-financing by charging a suitable registration fee. It was recommended that the Aeronautical Engineering Division be encouraged to proceed with this joint meeting, but that a suitable registration fee be charged so as to finance the cost of the meeting. The Division is of course at liberty to use its budget for this purpose, if it desires.

The question was raised as to whether or not the Agricultural Engineering Division should be retained as a Division in view of its declining activity. The Secretary stated that the Chairman of the Division had notified him that the Agricultural Engineers were holding a meeting during the month of either May or June and, because of this, the Division Officers had decided not to hold conferences at the Annual Meeting. The suggestion was made that Divisions which drop below a certain minimum level of activity should be either discontinued or revert back to Committee status so as to provide opportunity for other active groups that are qualified for Division status to come forward.

Committee to Recommend Personnel for ASEE Committees

Dr. Grinter stated that he would like to get as many nominations for Committee members for next year as possible. A number of suggestions have been received from the Chairmen of Sections and Divisions, as well as from Council members.

Bank Resolution

A resolution authorizing the President and Treasurer to co-sign checks jointly with either the Secretary or Assistant Secretary was authorized. This plan requires one signature at the Headquarters office and one signature by an officer outside of Headquarters.

Resolution to ASCE on Centennial Certificate

The Executive Board voted a resolution of thanks to the American Society of Civil Engineers for the Centennial of Engineering Certificate which was received by the Society.

Engineers Joint Council

The Secretary stated that he had been asked to serve on a Committee of the Engineers Joint Council to study the relationships between EJC and other national and regional societies, as well as individual members. He stated that during the coming year there will probably be a great deal of discussion as to whether or not EJC should incorporate some plan of individual membership and therefore requested recommendations from the Board.

The consensus of opinion of discussions which followed favored continuation of a council-type of organization, since the problems which EJC will handle are essentially those of advising the legislative and administrative branches of the Federal Government on broad problems relating to engineering. These can best be handled by a small group of competent authorities, rather than by establishing a complex and unwieldy system of individual membership, which would require referral of all matters to the individual membership. If a plan of individual membership is instituted, but the individual members are not consulted, they will justifiably feel left out. If they are consulted, the process becomes unwieldy so that it would be next to impossible to get answers in any reasonable period of time.

It was pointed out that EJC must find some way of establishing contact with individual members of the engineering profession who are interested in the EJC projects. Dean Grinter suggested the possibility of establishing conferences in large industrial centers at occasional intervals to discuss some of the major problems of EJC. The suggestion was also made that the EJC prepare News Releases suitable for publication in the various technical journals. The Executive Board favored the plan of setting aside a page in the Journal about every two or three months for news from ECPD and EJC.

Several amendments to the EJC Constitution were presented and acted upon.

Looking Ahead

Vice President White urged that the general theme and planning for the Annual Meeting be undertaken early in the Fall so that a properly coordinated program can be developed which would minimize conflicts.

Dr. Grinter asked for comments from the Executive Board as to the possibility of

centering the entire program next year around the theme "Evaluation of Engineering Education," since a great deal of vitalizing information seems to be stemming from this project. The discussion of the Board was favorable to this plan, although they felt that the matter should be placed up to the Division Chairmen to decide.

Respectfully submitted,
ARTHUR BRONWELL,
Secretary

In the News

A European Federation of Chemical Engineering was formally inaugurated at a Foundation Meeting held in the Maison de la Chimie in Paris on the 20th of June, 1953. The purpose of this Federation is to promote European co-operation in the fields of chemical engineering and equipment. The Federation owes its origin to efforts commenced in 1951, and which assumed a more concrete form during the course of the European Convention for Chemical Engineering and the ACHEMA X Chemical Engineering and Equipment Exhibition, which took place in 1952. These efforts have now been crowned with success.

Scientific and technical societies from Spain, Yugoslavia, Germany, Finland, The Netherlands, Portugal, France, and Switzerland were represented at the inauguration. Many more scientific and technical societies, some of which are located in Norway, Denmark, Luxemburg and Austria, have signified their early intention of joining the Federation.

The activities of the Federation are managed by a committee, and the following gentlemen were elected members of this Committee of Management: Herbert Bretschneider, Germany; Hans C. Egloff, Switzerland; Francis A. Freeth, Great Britain and Jean Gérard, France.

The General Secretariats of the European Federation of Chemical Engineering are located in the Maison de la Chimie, 28 Rue Saint-Dominique, Paris, and in the Dechema-Haus, Frankfurt am Main, Rheingauallee, 25.

Minutes of General Council Meeting

A meeting of the General Council of the American Society for Engineering Education was held on Monday, June 22, 1953, at the University of Florida, Gainesville, Florida. Those present were: W. R. Woolrich, *President;* M. M. Boring, E. A. Walker, W. C. White, J. H. Lampe, *Vice Presidents;* C. L. Skelley, *Treasurer;* A. B. Bronwell, *Secretary;* C. E. Watson, *Assistant Secretary;* H. P. Adams, William Allan, James M. Apple, H. H. Armsby, H. W. Barlow, H. R. Beatty, R. M. Boarts, C. A. Brown, S. W. Chapman, F. M. Dawson, W. W. Dornberger, W. L. Everitt, W. P. Godfrey, D. M. Griffith, C. O. Harris, S. C. Hollister, D. C. Hunt, H. Kuenzel, E. J. Lindahl, K. B. McEachron, Jr., F. H. Miller, Theodore H. Morgan, E. F. Obert, R. S. Paffenbarger, G. K. Palsgrove, N. F. Rode, L. A. Rose, Thorndike Saville, L. E. Stout, Ernst Weber, B. L. Wellman, K. F. Wendt, E. R. Wilcox, C. L. Wilson, S. E. Winston.

Secretary's Report

The Secretary presented a mimeographed report describing activities of the Society for the past year.

Treasurer's Report

The Treasurer discussed the Annual Audit. This is summarized in the minutes of the Executive Board meeting of June 20. The audit indicates a deficit of $1,687.72 for the year.

Budget for 1953–54

A tentative budget for 1953–54 was considered by the Council. Dean Dawson, Chairman of the Committee on Financial Policy, explained that the Soicety would probably operate at a deficit in the year ahead, the amount depending upon whether or not the Council wanted to maintain the JOURNAL OF ENGINEERING EDUCATION at its present level of operation. He stated that there is considerable expression of opinion among Society members that the JOURNAL should be expanded rather than contracted. He pointed out that a saving might be achieved by publishing the Yearbook every other year instead of every year. This would effect savings of about $3,000 in the alternate years, but would substantially load up the ASEE headquarters with extra editorial work in the years in which the Yearbook is published.

He explained that there is not much hope of reducing other items in the budget, since the substantial rise in prices, along with expansion of Society activities in recent years, has necessitated increased costs of operation. He also pointed out that the present dues classification system places an inordinate amount of labor on the Headquarters Office, since it is necessary to check the cards on every one of the 7,500 members each year to determine whether or not they have been promoted in rank and thus should pay higher dues. He stated that if a new dues structure is contemplated, it should be developed on an age basis with only two steps, so that members below a certain age limit, say 35, would pay one dues rate, and would increase automatically when the individual passes the transitional age.

Dean Dawson explained that the Society has a surplus of approximately three-quarters of the one year's operating expense and is in fairly good financial position, although it cannot sustain continuing deficits without weakening this position. He stated that a strong campaign is being put on by a Committee to get additional Associate Institutional Memberships and also that advertising rates have been increased in order to bring in additional revenue.

The Secetary explained that the office staff consists of himself and an Assistant Secretary, both part-time, and three office secretaries. This amounts to approximately one staff member for every 1,500 members. The other major engineering societies operate with Headquarter staffs of the order of 100 people and usually have approximately one staff member to every 300 members. He explained that the staff loading was extremely heavy and is growing rapidly as the Society activities expand. He stated that the Society should have four or five office

secretaries with the present level of operations.

Two recommendations of the Executive Board were considered by the General Council. These are:

1. Approve the tentative budget as proposed, and, in order to meet the publication budget, discontinue publication of the Yearbook during the current year. It was recognized that this would alleviate the budget problem for the current year, but the problem would have to be faced all over again next year when the Yearbook is published.

2. Increase the publication budget to $30,000 and publish the Yearbook this year. Also add $600 to salaries in order to provide part-time help which is seriously needed in the Headquarters Office. This would result in a budget deficit of approximately $3,600 for the coming year.

Professor H. Russell Beatty moved that the second proposal be accepted and recommended that a proposal be submitted by the Committee on Society Finance to the membership for an increase in dues.

A vote was taken to determine how many of the Council members would prefer publishing the Yearbook every two years, rather than every year. The majority of Council members favored publishing the Yearbook every year. The matter was deferred until the Friday morning meeting.

Reports of Vice Presidents

Mimeographed reports of the Vice Presidents were distributed to Council members.

Unionism in the Engineering Profession

President Woolrich reviewed the situation with respect to the growth of unionism in the engineering profession. He mentioned the testimony given by ESA before Committees of Congress on the amendments to the Taft-Hartley Law in favor of strong union legislative provisions, and stated that both EJC and NSPE presented arguments for legislative provisions which would protect the engineer from involuntary unionism. He also mentioned that the ASEE has taken an active role in this matter and has worked with and through the Manpower Commission of the Engineers' Joint Council in developing an awareness of the threat throughout the engineering profession.

One of the objectives of ESA is to set up student chapters in engineering colleges. Discussion of the Council members revealed no knowledge of any such student branches.

President Woolrich emphasized the fact that the salary scales of engineers often do not provide incentive for the experienced engineer and that this is a source of irritation which tended to encourage unionization. This matter has been called to the attention of industry by means of an editorial prepared by President Woolrich and distributed by the Engineering Manpower Commission.

It was recommended that President Woolrich's report be sent to the deans of engineering colleges with the recommendations that they discuss this problem with engineering students. It was also recommended that the article be sent to the Committee on Guidance of the Engineers' Council for Professional Development.

Shortage of Engineering Teachers

President Woolrich commented on the serious problem which many engineering colleges are facing in the shortage of competent teachers. He stated that many experienced teachers are being lured into industry at salaries beyond the reach of engineering colleges. He recommended that a Committee of three to five people be appointed, representing top men in industry and presidents of colleges or universities, to work out a solution of this problem. He stated that unless a rather positive solution is arrived at within a short time, there will be a shortage of over 1,000 engineering teachers by this Fall.

Upon motion by Professor Beatty, the Council voted to authorize appointment of the Committee consisting of top level industrial representatives and college presidents to discuss this problem and attempt to work out a solution.

Comments on the Report of the Committee on Evaluation of Engineering Education

Two resolutions,* approved by the Committee on Evaluation of Engineering Education for referral to the General Council were discussed. The Council recommended that the ASEE proceed cautiously on the second resolution. They suggested publication of the reports and a thorough discussion by the Society membership at one of the General Sessions before the matter be implemented.

* To be published in Oct. issue of JOURNAL.

Dean Everitt recommended that the report be transmitted to the Committee on Accreditation of ECPD for study and referral to constituent societies for their comments.

The first resolution was moved by Dean Hollister and seconded by Dean Saville and approved by the General Council.

The Secretary mentioned that the Engineering Foundation and the constituent societies of ECPD had contributed $6,000 for financing the project Evaluation of Engineering Education during the past year and an additional $6,000 has been pledged for the coming year. He also mentioned that Dr. Pletta will be retained as part-time Secretary of the Committee on Evaluation of Engineering Education during the coming year. He proposed resolutions of appreciation to the Engineering Foundation and the constituent societies of ECPD, which were favorably voted by the Council.

Plans for the Fall Meeting for ASEE–ECPD

The Secretary stated that the Fall meetings of the ECRC and ECAC this year will be held in conjunction with the Annual Meeting of the ECPD at the Statler Hotel in New York on October 15–17. The ECAC–ECRC will have a conference program, with a luncheon speaker, dealing with the general theme of creative thinking in the arts and creative thinking in research. The entire conference program is open to the ASEE membership.

The Secretary also mentioned that provisions would be made for meeting rooms for Divisions and Committees which wish to hold Committee meetings in order to get their activities for the year started early in the Fall. The General Council will probably meet on October 14 at the Statler Hotel in New York.

Continuation of Paper Contest for Young Engineering Teachers

President Woolrich asked for comments on the Young Engineering Teachers' Paper Contest, which was inaugurated for the first time this year. The Council members expressed considerable interest in this program as a means of developing active participation of younger faculty members and awareness on the part of these faculty members of the problems confronting engineering education. They urged that the competition be continued.

Committee on Annual Meeting

The Secretary suggested that a Committee be appointed to review the Annual Meeting and make recommendations for improvement. He stated that the number of conferences of the various Divisions and Committees have grown to the point where serious conflicts are involved. On some afternoons there were twelve to fourteen conferences scheduled concurrently, and in some of these there are overlapping areas of subject matter, despite concerted efforts to minimize these conflicts. The present plan of holding three General Sessions in the mornings reduces the time available for the Division conferences. This year an innovation was attempted in the form of a General Session on Monday afternoon to inform the Society membership of current developments in major Society projects and provide an opportunity for membership discussion relating to these projects. This innovation proved exceedingly successful. He stated that in the past the Executive Board has handled the planning of the Annual Meeting at regular Executive Board meetings, but the pressure of other matters of business did not make it possible to devote sufficient time to explore the matter thoroughly. A committee appointed specifically for this purpose could meet once or twice during the year and explore in careful detail the problems relating to the Annual Meeting and then prepare recommendations for consideration by the Executive Board.

Exhibits at the Annual Meeting

Numerous requests have been received from commercial organizations for permission to hold exhibits at the Annual Meeting. The Secretary stated that the Engineering Drawing Division usually holds exhibits at the Annual Meeting, but for the most part other exhibits are discouraged because of the additional burden it places upon the Host Institution. However, it was thought advisable for the General Council to consider this matter and decide whether or not they wanted to have exhibits at future Annual Meetings.

Dean Wendt moved that commercial exhibits be barred from Annual Meetings. The motion was passed. It was the sense of the Council that this did not bar exhibits which are specifically requested by a Division of the Society, but that it should be used to discourage commercial exhibits in general.

Honorary Memberships

The General Council unanimously passed a resolution to grant honorary memberships to Dean H. P. Hammond and Dean A. A. Potter.

Location of 1954 and 1955 Annual Meetings

The Secretary mentioned that the 1954 Annual Meeting will be held at the University of Illinois, June 13–18. The 1955 meeting will be at Pennsylvania State College and the 1956 meeting will be at the University of Toronto.

Life Membership

The Secretary presented a list of applicants for life membership all of whom had satisfied the constitutional requirements. Dean Dawson moved acceptance and the Council unanimously passed the motion.

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A meeting of the General Council of the American Society for Engineering Education was held Friday, June 26, 1953, at 7:30 A.M. in the Training Room, University of Florida, Gainesville, Florida. Those present were W. R. Woolrich, *President;* W. C. White, *Vice President;* A. B. Bronwell, *Secretary;* C. E. Watson, *Assistant Secretary;* newly-elected officers: L. E. Grinter, *President-elect;* W. L. Everitt, B. R. Teare, Jr., *Vice Presidents-elect;* G. W. Farnham, *Treasurer-elect;* William Allan, J. M. Apple, H. H. Armsby, H. W. Barlow, H. R. Beatty, R. M. Boarts, G. P. Brewington C. A. Brown, Stuart W. Chapman, N. A. Christensen, F. M. Dawson, W. W. Dornberger, M. A. Durland, F. W. Edwards, W. P. Godfrey, C. O. Harris, S. C. Hollister, D. C. Hunt, H. Kuenzel, Erie J. Lindahl, J. C. McKeon, F. H. Miller, C. W. Muhlenbruch, R. S. Paffenbarger, G. K. Palsgrove, F. H. Pumphrey, N. F. Rode, H. P. Rhodes, Thorndike Saville, E. B. Stavely, L. E. Stout, R. W. Van Houten, R. E. Vivian, Ernst Weber, B. L. Wellman, Kurt Wendt, H. H. Wheaton, G. R. Wilcox, S. E. Winston and M. Merrill.

Engineers Joint Council

Dean Saville commented on activities of EJC, stating that it was proceeding slowly and cautiously, but making significant progress on a number of major problems, including a study of the problem of unionization of the profession, amendments to the Taft-Hartley Law, amendments to the Atomic Energy Act, and recommendation of policies to the National Water Policy Board. He stated that at present EJC is not trying to create a new engineering society in competition with existing professional societies, but rather is trying to work by delegated authority with the existing societies.

Recommendations from the Committee on Financial Policy

Dean Dawson, Chairman of the Committee on Financial Policy, presented the report of the Committee which is published elsewhere in this issue.

The Council discussed the possibility of effecting a saving in costs of printing the JOURNAL OF ENGINEERING EDUCATION by using the offset printing process. It was moved that the President authorize a Committee to investigate ways of effecting possible savings in printing costs, but consistent with the maintenance of attractiveness and effectiveness. The motion was approved.

Dean Saville stated that the ASEE has now become of age and must make its influence felt in its relationships with ECPD, EJC, and other engineering societies. He stated that this can be done only if the Society has representatives at these meetings and urged that adequate provision be made for travel budget for officers and the Secretary.

A motion was made to adopt the recommendations of the Committee on Financial Policy. This was unanimously passed by the Council.

Recommendations of the Committee on Evaluation of Engineering Education

The Council considered the proposals of the Committee on Evaluation of Engineering Education, specifically the procedure for accreditation of the Professional General and Professional Scientific stems, as well as the desirability of using a starred designation on curricula of exceptional merit.

In the discussion it was pointed out that there is need for raising the standards of accreditation of engineering curricula and also of providing for recognition of exceptionally meritorious programs. However, there was considerable discussion as to the difficulties which might be encountered by using a starred designation for meritorious performance, it being indicated that this procedure would involve many difficult procedural ramifications and would be subject

to widespread criticism emanating from schools which feel that they deserve such recognition, but have not received it. It was pointed out that other organizations which have attempted meritorious designation of this general character have abandoned it.

The previous Council Meeting had recommended publication of the Report of the Committee on Evaluation of Engineering Education in an early issue of the Journal, so no further action was taken.

Sponsorship of Joint Conferences

A resolution authorizing the sponsorship of technical conferences jointly with other engineering societies, upon approval by the ASEE Executive Board, was approved.

The Secretary presented a proposal for the establishment of a procedure for developing technical conferences in specialized areas under joint sponsorship of the Divisions of the ASEE and other engineering societies. The purpose is to identify those areas where the science and technology are moving ahead rapidly. Conferences would then be arranged in these specific areas with the objective of exploring the subject thoroughly, identifying the fundamentals involved, and determining how these might be worked into the engineering curriculum.

It was moved by Dean Hollister that the Society give active and vigorous support to such a program and that the President appoint a Committee to study areas which may be suitable for development of such programs and take steps to implement the proposal. The motion was approved.

Proposal for Project on Prediction of Success

Professor Wilcox presented a request prepared jointly by the Division of Relations with Industry and the ECAC Committee on Selection and Guidance. The request was for ASEE support for a testing program, to be conducted by the Educational Testing Service, which would determine if there is any basis for reliable prediction of success of engineering graduates.

It was moved that the General Council endorse this activity. Motion passed.

Resolutions of Technical Institute Divisions

The Secretary read three resolutions proposed by the Technical Institute Division.

The first resolution proposed that Technical Institutes be recognized as "institutions of higher learning." Dr. Rhodes stated that the Veterans Administration requires that institutions which are eligible to receive veterans benefits must be categorized either as secondary schools or as institutions of higher learning. He stated that Technical Institutes are definitely not secondary schools and that the Veterans Administration had been hesitant without proper authority to classify them as "Institutions of Higher Learning." He stated that if a Technical Institute could show that 40% of its curriculum is transferable for college credit, it would be classed as "Institution of Higher Learning" and would receive veterans benefits.

Dean Grinter pointed out that whether or not a particular institution is an "Institution of Higher Learning" is not a matter which can be settled by a legislative procedure. Professor Christensen stated that he did not see how the ASEE could deny Technical Institutes the privilege of being recognized as institutions of higher learning, assuming that they have accredited programs. Dr. Armsby moved that the resolution be adopted and the Council voted 14–5 in favor of the resolution.

The second resolution proposing that the Technical Institute Division have a representative on the EJC Manpower Commission was a matter of administrative action and Dean Grinter indicated that he favored the proposal.

The third resolution asking ASEE endorsement for the use of "engineering technician" to designate technical institute graduates and also "associate degree" as a degree title was considered by the General Council in June, 1952.

This was considered by a Committee which recommended that the ASEE accept the resolution as stated, with reservations regarding the use of the word "engineering" as a qualifying adjective. Discussion of the Council indicated that the Council members did not feel that the report was specific enough to provide a basis of action.

Dean Hollister stated that the entire matter of engineering degrees is a subject which should be considered in its entirety by the Society and recommended that an ad hoc Committee be appointed to study this problem. He moved that the President be authorized to appoint an ad hoc Committee to study the designation of degrees. Motion was passed.

Dr. Rhodes stated that the Technical In-

stitutes are not granting and do not wish to grant professional degrees. He pointed out that many Junior Colleges are now granting Associate Degrees, which is what is proposed in the resolution, and that this degree has been recognized by the U. S. Government.

Professor Beatty emphasized that the engineer and the technician are a team in industry and that the technicians need to have their positions recognized by members of the engineering profession. This is something that Technical Institutes cannot do alone, but with the aid of the engineering profession, they can get the necessary recognition.

Committee Reports

Dean Freund reported on the work of the Committee on Ethics, stating that the study will be continued during the coming year and that the problem should be kept constantly before engineering educators. He suggested that the Committee might perform a useful service by preparing subject matter references which would assist teachers in obtaining case material.

Professor Muhlenbruch reported that the Committee on Teaching Aids expected to complete its work on publication of the catalogue on visual aids by June, but delays have forced completion of the project to be moved ahead until this Fall. He suggested that the work of the Committee be turned over to a standing committee of the Educational Methods Division after the Teaching Aids Committee has completed its assignment.

Mr. Jess McKeon, Chairman of the Committee on Associate Institutional Memberships, reported that the Committee had increased the number of Associate Institutional Memberships from 3 to 37 in the first year's operations and that 16 additional companies had been approved at the Executive Board Meeting, June 24.

Public Relations Committee

Professor Lisle Rose, Chairman of the Committee on Public Relations, briefly commented on the work of the Public Relations Committee during the year and also its work in publicizing the Annual Meeting.

Resolution of Committee on Secondary Schools (ECAC)

Profesor Lisle Rose presented a resolution, urging industrial and government support for improvement of teaching, which had been favorably voted by the ECAC and referred to the Council, was moved and voted by the General Council. It was recommended that this resolution be sent to the Edison Foundation and to the Future Scientists of America. The Committee on Secondary Schools will implement the recommendations in this resolution.

Committee on Improvement of Society Functions

Secretary Bronwell, reporting for Dean Teare, commented on the progress of the Committee on Society Function. This Committee has held three meetings and three sub-committees have been appointed to prepare recommendations in various areas of Society activities. The principal objective is to study the Society structure and functions, with a view toward achieving a clearly defined structural organization for optimum performance, securing better coordination of Society activities, providing channels for the upward flow of ideas, and providing promotional channels for optimum utilization of the Society's competent manpower.

Expression of Appreciation from President Woolrich

President Woolrich expressed his deep appreciation to the Officers of the Society for the excellent cooperation which he had received during the past year and also to the Officers of Divisions, Sections, Branches, and members of the General Council for the wholehearted and progressive spirit in which they had carried forward the responsibilities of the Society during the year.

Comments by Dean Grinter

Dean Grinter stated that he hoped that the Divisions, Sections and Committees of the Society would give serious consideration to development of the project "Evaluation of Engineering Education" during the coming year, with a view toward pointing up this project at the next Annual Meeting. He paid tribute to the retiring members of the Board and expressed his grateful appreciation for the very able group of officers whom the Society had selected for the coming year.

Respectfully submitted,

ARTHUR BRONWELL,
Secretary

Section Meetings

Section	*Location of Meeting*	*Dates*	*Chairman of Section*
*Allegheny	University of Pittsburgh		W. I. Short, University of Pittsburgh
Illinois-Indiana	Illinois Institute of Technology	May, 16, 1954	R. G. Owens, Illinois Institute of Technology
Kansas-Nebraska	Kansas State College	Oct. 9–10, 1953	M. H. Barnard, University of Nebraska
Michigan	University of Michigan	May 8, 1954	F. L. Schwartz, University of Michigan
Middle Atlantic	University of Pennsylvania	Dec. 5, 1953	C. Bonilla, Columbia University
Missouri-Arkansas	Missouri School of Mines	April 10, 1954	V. J. Blum, St. Louis University
National Capital Area	Johns Hopkins University	Oct. 3, 1953	C. H. Walther, George Washington University
New England	University of Vermont	Oct. 10, 1953	E. T. Donovan, University of New Hampshire
North Midwest	Marquette University	Oct. 9–10, 1953	A. B. Drought, Marquette University
Ohio	Ohio State University	May 1, 1954	R. S. Paffenbarger, Ohio State University
Pacific Northwest	Oregon State College	April 23–24, 1954	L. Slegel, Oregon State College
Pacific Southwest	San Jose State College	Dec. 29–30, 1953	C. M. Duke, University of California at Los Angeles
*Rocky Mountain	University of Utah		A. Diefendorf, University of Utah
Southeastern	North Carolina State College	March 18–20, 1954	J. R. Cudworth, University of Alabama
Southwestern	University of New Mexico	April 16–17, 1954	J. J. Heimerich, University of New Mexico
Upper New York	Rochester Institute of Technology	October 16–17, 1953	F. E. Almstead, State University of New York, Albany

Members of the Society are welcome at all Section Meetings

* No Date Set.

New Members

ADAMS, WILLIAM F., Associate Professor of Electrical Engineering, Texas A. & M. College, College Station, Tex. N. F. Rode, M. C. Hughes.

ANDREW, EDWARD H., JR., Assistant Professor of Electrical Engineering, Texas A. & M. College, College Station, Tex. N. F. Rode, R. M. Wingren.

ANDREWS, ROBERT V., Associate Professor of Chemical Engineering, Texas A. & M. College, College Station, Tex. J. D. Lindsay, F. F. Bishop.

BENISCHEK, HOWARD W., Associate Professor and Chairman, Petroleum Engineering, University of Oklahoma, Norman, Okla. F. C. Larson, J. F. Brookes.

BENNETT, ROBERT B., Professor of Chemical Engineering, University of Florida, Gainesville, Fla. W. H. Beisler, J. M. Duncan.

BOYLAN, DAVID R., Assistant Professor of Chemical Engineering, Iowa State College, Ames, Iowa. M. Smutz, B. F. Ruth.

BUTCHER, HAROLD G., Instructor, Technical Institute, Franklin University, Columbus, Ohio. L. D. Jones, W. D. Turnbull.

CALDWELL, JAMES W., Associate Professor of Industrial Engineering, Pennsylvania State College, State College, Pa. G. L. Thuering, B. W. Niebel.

CHANG, SHELDON SHOU-LIEN, Assistant Professor of Electrical Engineering, New York University, New York, N. Y. B. J. Ley, D. B. Porter.

CLEAVER, FREDERICK W., Instructor in Industrial and Engineering Administration, Cornell University, Ithaca, N. Y. M. W. Sampson, R. F. Chipak.

COOPER, LOUIS M., Instructor in Mechanical Engineering, Milwaukee School of Engineering, Milwaukee 15, Wis. F. J. Van Zeeland, F. Kaufmann.

CRANCH, EDMUND T., Assistant Professor of Engineering Mechanics, Cornell University, Ithaca, N. Y. H. C. Perkins, D. F. Gunder.

CYPHERS, HOWARD E., Assistant Professor of Mechanical Engineering, Rensselaer Polytechnic Institute, Troy, N. Y. G. K. Palsgrove, J. G. Fairfield.

DAY, EMMETT E., Associate Professor of Mechanical Engineering, University of Washington, Seattle, Wash. L. B. Cooper, M. Guidon III.

DEMOREST, WARREN L., Instructor, Milwaukee School of Engineering, Milwaukee, Wis. F. J. Van Zeeland, F. Kaufmann.

DILLON, FRANK H., Professor of Engineering, Bradford Durfee Technical Institute, Fall River, Mass. A. A. Stewart, E. R. Williams.

DUDLEY, DAVID A., Assistant Director, Admissions, Assistant Professor of English, Massachusetts Institute of Technology, Cambridge, Mass. H. R. Bartlett, L. Bryant.

FLOE, CARL F., Professor of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass. W. R. Woolrich, A. B. Bronwell.

FRASCH, JOSEPH F., Director, Franklin University, Columbus, Ohio. L. D. Jones, W. D. Turnbull.

FREGETTO, DOUGLAS F., Instructor in English, Milwaukee School of Engineering, Milwaukee, Wis. F. J. Van Zeeland, F. Kaufmann.

GIEDT, WARREN H., Assistant Professor of Mechanical Engineering, University of California, Berkeley, Calif. P. B. Stewart, E. D. Howe.

HARMER, RICHARD L., Dean, Technical School, Franklin University, Columbus, Ohio. L. D. Jones, W. D. Turnbull.

HAZEL, JAMES F., Associate Professor of Chemistry, University of Pennsylvania, Philadelphia, Pa. A. Jorgensen, E. F. Stover.

HNATIUK, BOHDAN T., Assistant Professor of Aeronautical Engineering, University of Notre Dame, Notre Dame, Ind. R. S. Elsenberry, F. N. Brown.

HOUP, KENNETH W., Associate Professor of English, Pennsylvania State College, State College, Pa. R. E. McCocal, V. E. Neilly.

HUGHES, VIRGIL L., Head, Engineering, Southern State College, Magnolia, Ark. G. F. Branigan, N. H. Barnette.

JONES, EARL E. R., Principal Extension Representative, University of California, Berkeley, Calif. E. D. Howe, A. S. Levens.

JONES, GEORGE L., JR., Assistant Professor of Chemistry, Clarkson College of Technology, Potsdam, N. Y. C. Hecker, D. G. Stillman.

KELLER, EARL W., Assistant Professor of Electrical Engineering, Massachusetts Institute of Technology, Cambridge, Mass. T. F. Jones, Jr., E. A. Williams.

KLINE, BENNET E., Associate Professor of Industrial Management, Purdue University, Lafayette, Ind. M. Graney, C. W. Beese.

KONECNY, ANTHONY R., Instructor in Mechanical Engineering, University of Washington, Seattle, Wash. E. Laitala, B. T. McMinn.

KRAMM, HARTZELL M., Instructor in Drawing, Milwaukee School of Engineering, Milwaukee, Wis. F. J. Van Zeeland, F. Kaufmann.

LABES, WILLIS G., Assistant Professor, Fire Protection and Safety Engineering, Illinois Institute of Technology, Chicago, Ill. R. H. Owens, J. J. Ahern.

LAMONT, NORMAN, Assistant Professor of Petroleum Engineering, Texas Technological College, Lubbock, Tex. W. L. Ducker, D. E. Holcomb.

LARSEN, MERWIN J., Head, Electrical Engineering, University of Florida, Gainesville, Fla. P. H. Nelson, L. E. Schoonmaker.

LAZAR, NICHOLAS M., Associate Professor of Engineering, Wayne University, Detroit, Mich. R. H. Schoonover, R. W. Grant.

LOANE, GEORGE H., Assistant Professor of Electrical Engineering, University of New Brunswick, Fredericton, N. B., Canada. E. O. Turner, A. B. Bronwell.

MACLEAN, GEORGE R., Associate Professor of Mechanical Engineering, Clarkson College of Technology, Potsdam, N. Y. Y. C. Yang, E. McHugh.

MATLOCK, HUDSON, Assistant Professor of Civil Engineering, University of Texas, Austin, Tex. P. M. Ferguson, C. W. Morgan.

MCDONALD, PATRICK H., JR., Research Associate Professor, Engineering Research Dept., North Carolina State College, Raleigh, N. C. V. W. Conner, G. W. Smith.

MCHUGH, CARL M., Associate Professor of Drawing and Design, Clemson Agricultural College, Clemson, S. C. D. W. Bradbury, J. E. Shigley.

MITCHEL, ROY D., Instructor in Engineering Drawing, Odessa College, Odessa, Tex. R. T. Northrup, A. B. Bronwell.

MOORE, LEO B., Assistant Professor of Industrial Management, Massachusetts Institute of Technology, Cambridge, Mass. A. B. Bronwell, W. R. Woolrich.

MOSKUITINOFF, IVAN T., Lecturer in Civil Engineering, City College of New York, New York, N. Y. W. Allan, W. L. Willig.

NEWTON, JOHN P., Associate Professor of Electrical Engineering, Rutgers University, New Brunswick, N. J. S. Fich, P. S. Creager.

O'CONNER, JOHN J., Assistant Dean, State University Maritime College, Fort Schuyler, New York, N. Y. J. J. Foody, C. H. Young.

PEACH, MILTON O., Associate Professor of Engineering Mechanics, University of Notre Dame, Notre Dame, Ind. J. A. McCarthy, W. L. Shilts.

POETZ, ROBERT G., Instructor in Chemistry, Newark College of Engineering, Newark, N. J. D. W. Dickey, M. W. Braunn.

QUINLAN, MAURICE D., Coordinator, College Relations, Personnel, Western Electric Co., New York, N. Y. O. Carpenter, D. S. Bridgman.

RAM, GERSON L., Instructor in Chemistry, Newark College of Engineering, Newark, N. J. D. W. Dickey, M. W. Braunn.

REED, MARION B., Assistant Professor of Electrical Engineering, Louisiana State University, Baton Rouge, La. M. B. Voorhies, L. V. McLean.

RETHERFORD, ROBERT C., Associate Professor of Electrical Engineering, University of Wisconsin, Madison, Wis. T. J. Higgins, H. A. Peterson.

RUTLAND, JASPER L., Instructor in Civil Engineering, The Citadel, Charleston, C. C. J. C. Key, L. S. LeTellier.

ST. JOHN, JOHN D., Instructor in Electrical Engineering, Milwaukee School of Engineering, Milwaukee, Wis. F. J. Van Zeeland, F. Kaufmann.

SCHMERZLER, LAWRENCE J., Lecturer in Mechanical Engineering, Newark College of Engineering, Newark, N. J. G. B. Thom, W. Ornstein.

SCHWICHTENBERG, RICHARD J., Instructor in English, Milwaukee School of Engineering, Milwaukee, Wis. F. J. Van Zeeland, F. Kaufmann.

SWOFFORD, RALPH P., JR., Brig. Gen., Commandant, USAF Institute of Technology, Wright-Patterson Air Force Base, Ohio. R. H. Downing, A. M. Musgrove.

SYMANIK, EMIL F., Acting Department Head and Professor of English, Milwaukee School of Engineering, Milwaukee, Wis. K. O. Werwath, F. Kaufmann.

TABER, BOND, Assistant Professor of Geology, University of Alaska, College, Alaska. E. F. Rice, E. H. Beistline.

THURSTON, CLARK F., Assistant Professor of English, Pennsylvania State College, State College, Pa. R. E. McCord, V. E. Neilly.

TOONG, TAU-YI, Assistant Professor of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge 39, Mass. J. Holt, J. Kaye.

TWIGG, JOHN F., Instructor in Graphics, Massachusetts Institute of Technology, Cambridge, Mass. S. A. Coons, J. W. Rule.

VIVIAN, J. EDWARD, Associate Professor of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Mass. T. K. Sherwood, W. K. Lewis.

VON STEENBURGH, RAYMOND V., Instructor in Drafting, Milwaukee School of Engineering, Milwaukee, Wis. F. J. Van Zeeland, F. Kaufmann.

WATSON, SAMUEL M., JR., Professor of Mechanical Engineering, Clemson Agricultural College, Clemson, S. C. B. E. Fernow, J. H. Sams.

WILKE, CHARLES R., Associate Professor of Chemical Engineering, University of California, Berkeley, Calif. T. Vermeulen, H. A. Johnson.

WILLIAMS, ROBERT D., Professor Emeritus of Psychology, Ohio State University, Columbus, Ohio. L. D. Jones, W. D. Turnbull.

WOODARD, HERBERT L., Executive Secretary, Colorado Society of Engineers, Inc., Denver, Colo. T. H. Evans, C. L. Eckel.

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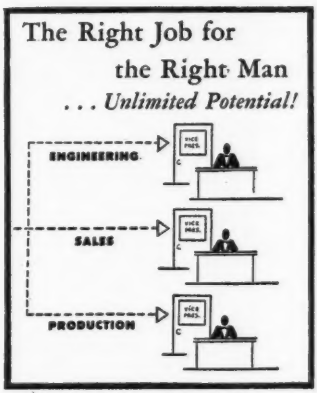

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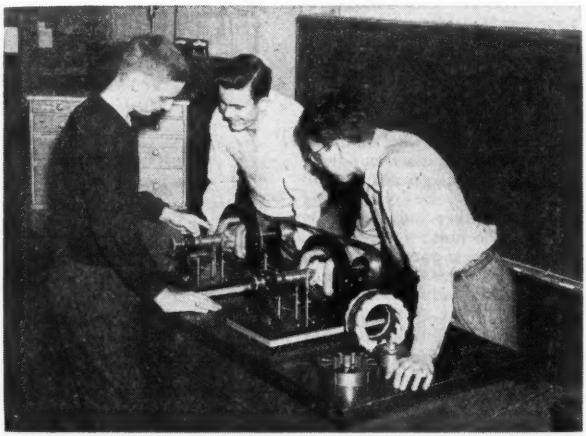

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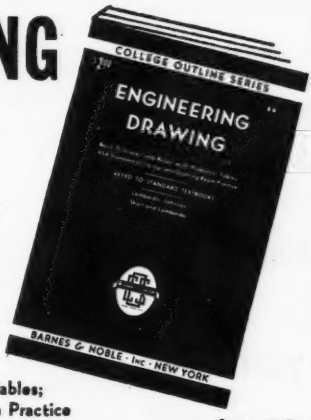

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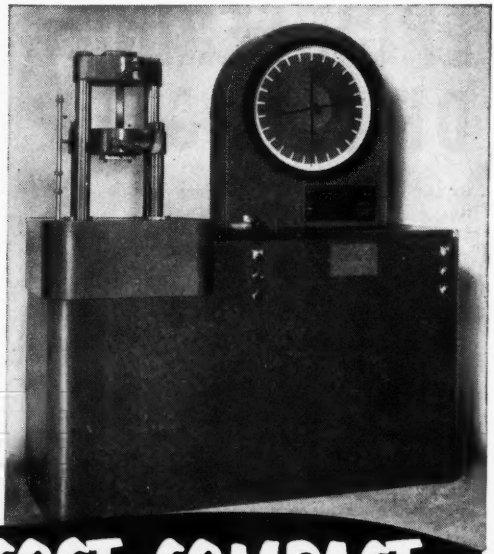

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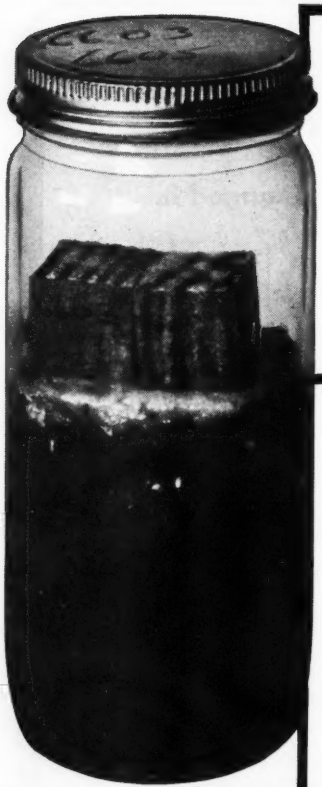

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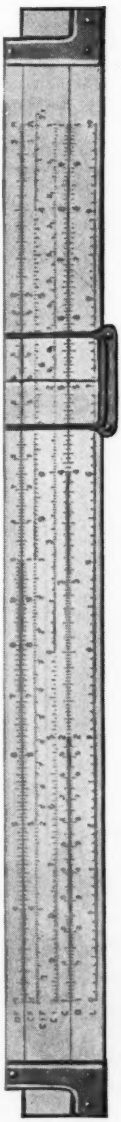

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